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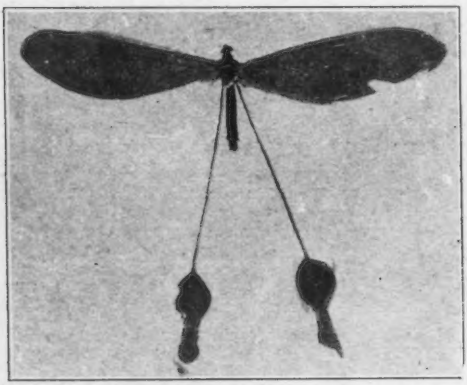

Halter americana Cockerell.

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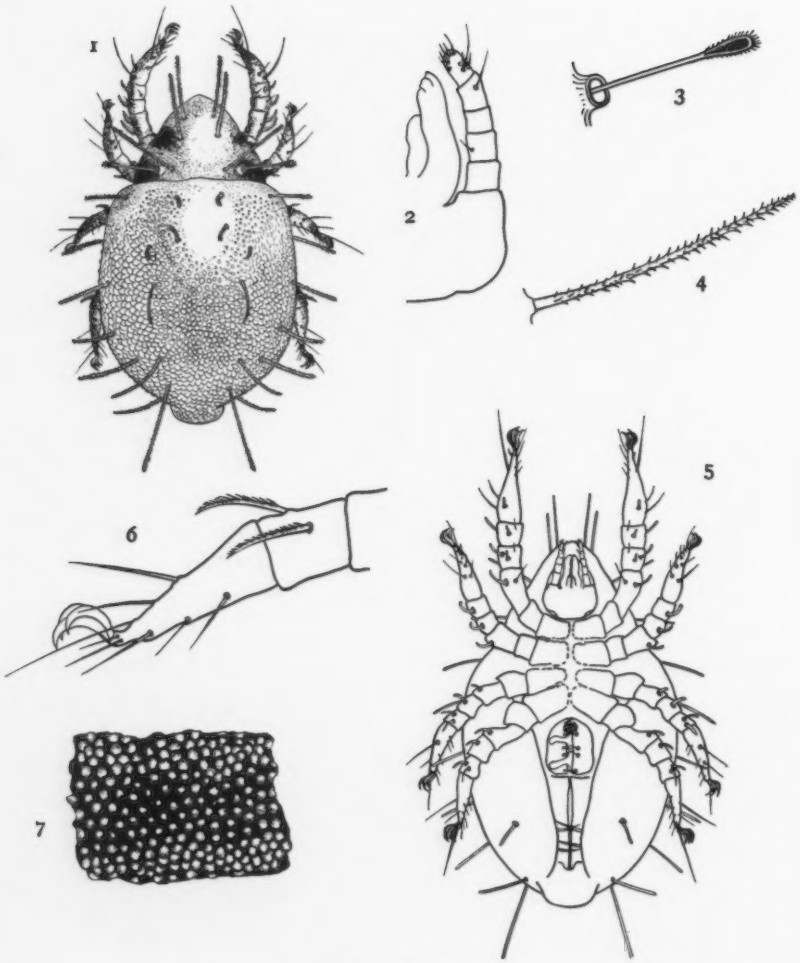

ORIBATIDAE—EWING.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XIX. JUNE, 1908. No. 6.

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A New Genus and Species of Oribatidae.

BY H. E. EWING, Arcola, Ill.

(Plate XI.)

The new genus described in this paper is the second of this group peculiar to North America. The first genus described as peculiar to this country was *Gymnobates*, Banks; recently I have added to my collection two new species which belong to this genus. The genus *Tumidalvus* described in this paper is perhaps nearer to *Lohmannia* than to any other of the known genera.

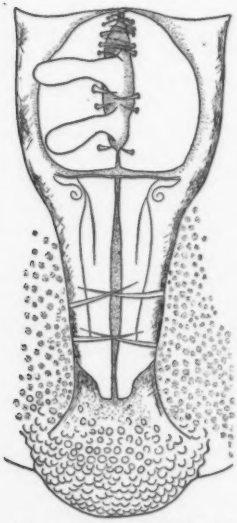


FIG. 1.—Median ventral region of abdomen, X 154.

TUMIDALVUS n. gen.

Pteromorphæ absent; cepthalothorax anchylosed with abdomen; mandibles chelate; lamellæ absent. Legs short and stout. There is no ventral plate to the abdomen. The dorsal plate extends down over much of the ventral part of the abdomen and touches both the anal and genital covers (Fig. 1). Anal and genital covers separated only by a rim common to both. Unguis tridactyle. The ab-

domen is oval and bears a large median boss or tubercle on the posterior end.

This genus resembles somewhat *Lohmannia* Michael, but differs from it in having three claws at the tip of the tarsus instead of one; in having the abdomen terminate posteriorly in a large swelling or tubercle; also in the shape of the abdomen, which is not cylindrical as in *Lohmannia,* but is oval, as in most Oribatidæ.

Tumidalvus americana n. sp.

Light brown; posterior part of the abdomen much darker than the rest of the body.

Cephalothorax almost as broad as long; no lamellæ. The cephalothorax bears three prominent pairs of large, stout, pectinate bristles (Pl. XI, Fig. 1); those of the anterior pair, situated near the tip of the rostrum, are about one-half as long as the cephalothorax and are directed forwards; at about the middle of the dorsal surface of the cephalothorax is situated a similar but slightly stouter pair of bristles, equal in length to the anterior pair; there is a much larger posterior pair of bristles situated almost approximate to the posterior margin of the cephalothorax, between the pseudostigmata; they are directed outwards and are about one-third longer than the middle pair. The pseudostigmata (Fig. 3) are prominent, cylindrical in shape, and about one-half as broad as the tibia of leg 1. The pseudostigmatic organ has a long, straight peduncle and a small clavate head; it is about two-thirds as long as the posterior pair of bristles.

The abdomen is about three-fifths as broad as long; the surface is covered with rather small, round tubercles of almost uniform size (Fig. 7); on the median posterior aspect of the abdomen there is a large swelling or tubercle, already mentioned as a generic character. The dorsum of the abdomen bears twelve pairs of stout, pectinate bristles (Fig. 4). There are two rows of six bristles each on the dorsum, one on each side of the median line and not far from the same; the bristles in these rows increase in size from the anterior pair backwards; the anterior pair is about one-fifth as long as the posterior pair. There is a row of six subequal bristles on each side of the abdomen, on or slightly above the lateral margin. Genital and anal covers contiguous (Fig. 5); genital covers about two-thirds as long as anal covers, and each bearing on its inner margin eight stout, short, sharp spines, which point inwards; anal covers very long and narrow, each bearing near its outer margin two prominent stout bristles, which point inwards; each bristle is about twice as long as the width of the anal cover at the point where it is situated.

Legs stout and short, the anterior pair being about three-fifths

as long as the abdomen; tarsus of leg 4, one and one-half times as long as the tibia; tibia almost as broad as long (Fig. 6); genual equal to the tibia in length, but slightly broader than the same. All the legs bear a few stout, curved, pectinate bristles, and the tarsi several simple bristles. Unguis tridactyle, dactyles equal.

Length 0.70 mm.; breadth 0.45 mm.

In moss. Collected by the writer at Arcola, Ill.

EXPLANATION OF PLATE.

Fig. 1. *Tumidalvus americana*, dorsal view, X 92.
Fig. 2. *Tumidalvus americana*, labial organs of the left side, X 202.
Fig. 3. *Tumidalvus americana*, pseudostigma and pseudostigmatic organ, X 202.
Fig. 4. *Tumidalvus americana*, seta from the abdomen, X 202.
Fig. 5. *Tumidalvus americana*, ventral view, X 95.
Fig. 6. *Tumidalvus americana*, tibia and tarsus of leg, IV, X 202.
Fig. 7. *Tumidalvus americana*, piece of integument from dorsum of abdomen, X 210.

Some Crabronidae from Colorado and New Mexico.

By S. A. Rohwer, Boulder, Colo.

Crabro (Protothyreopus) dilectus Cress. ♀ Florissant, Colo., July 7, 1907 (S. A. Rohwer); the markings are yellow, not whitish, scutellum black, post-scutellum yellow, spots on third abdominal segment meeting. ♂ Florissant, Colo., July 12, 1906 (S. A. Rohwer) fls. *Geranium*; the markings are yellow, those on the abdomen somewhat whitish. ♂ Beulah, N. M., Aug. (Ckll.); does not quite agree, the spots on the first abdominal segment meet, two small spots on each side of posterior face, markings dark yellow. Perhaps *dilectus* is merely a variation of *bigeminus* Patt.

Crabro (Protothyreopus) rufifemur Pack. ♀ Cripple Creek, Colo., July 31, 1906, about 9100 ft., fls. *Potentilla* (S. A. Rohwer). New to Colorado.

Crabro (Thyreopus) vincus Cress. ♀ Cripple Creek, Colo., July 31, 1906, about 9100 ft., fls. *Pentstemon* (Roh.); ♀ Copeland Park, Boulder Co., Colo., about 8500 ft., Sept. 6, 1907 (G. M. Hite); ♀ Boulder, Colo., Sept., 1906 (G. M. Hite); ♀ Florissant, Colo., July 18, 1906 (Ckll.); ♀ Boulder, Colo., June (G. M. Hite) is 8 mm. The Cripple Creek speci-

men has the bands on the abdomen wider and darker yellow. The pubescence is black.

CRABRO (Thyreopus) LATIPES Sm. 6 ♂ ♂ Florissant, Colo., June and July, 1907, on foliage of *Ribes vallicola* (Roh.); 4 ♂ ♂ Florissant, Colo., July, 1906 "flying around *Ribes*," (Ckll.); 2 ♂ ♂ Florissant, Colo., July 7, 1907, on foliage of *Salix brachycarpa* (Roh.); 4 ♂ ♂ Boulder, Colo., Sept. 4, 1906, on foliage of *Vitis vinifera*, (Roh.); ♂ Boulder, Colo., June (G. M. Hite); ♂ Copeland Park, Boulder Co., Colo., Sept. 6, 1907 (Roh.). The last does not seem to be the same, but I can find no good characters on which to separate it. All of them have black hair on thorax above and vertex, pale hair on the front, white on mesopectus. The abdomen is elongate as in *Coloradensis* Pack., which is considered a synonym of *latipes*. The strength of the metathoracic ridges varies somewhat, also the keel on the cheeks.

CRABRO (Synothyreopus) CONSPICUUS Cress. Boulder, Colo., May 18 (G. M. Hite), Aug. 30, 1906 (Roh.).

CRABRO (Blepharipus) NIGRICORNIS Prov. ♀ Copeland Park, Boulder Co., Colo., Sept. 4, 1907, alt. about 8500 ft. (Roh.). New to Colorado.

CRABRO (Blepharipus) ATER Cress. Florissant, Colo., July 7, 1907, fls. *Heracleum lanatum*, (Roh.).

CRABRO ERRANS Fox. ♂ Jim Creek, Boulder Co., Colo., Sept. 7, 1907, fls. *Eriogonum effusum* (Roh.); Florissant, Colo., July 21, 1906, on *Cleome serrulata*, also July 19, 1906 (Ckll.); ♂ Las Vegas, N. M., June 7 (Ckll.).

CRABRO (Cuphopterus) CONFERTUS Fox. ♀ Copeland Park Park, Boulder Co., Colo., Sept. 6 1907, (Roh.); ♂ Florissant, Colo., July 18, 1906 (Ckll.). The male has a good deal of white pubescence on the head and thorax.

CRABRO (Solenius) BELLUS Cress. ♀ Boulder, Colo., June 11 (G. M. Hite); ♀ Florissant, Colo., July 28, 1907, fls. *Carduus acaulescens*, also July 21, 1907, fls. *Geranium richardsonii* (Roh.).

CRABRO (Xestocrabro) SEXMACULATUS Say. Las Vegas, N. M., Aug. 3, 1907 on foliage of *Veratrum* (Ckll.).

CRABRO (Xestocrabro) TRIFASCIATUS Say. ♀ Cripple Creek,

Colo., July 17, 1906, fls. *Linum lewisii* (Roh.); 2 ♀ ♀ Florissant, Colo., July 21, 1907, fls. *Geranium richardsonii* (Roh.); 3 ♂ ♂ Florissant, Colo., July 7, 1907, fls. *Heracleum lanatum*, (Roh.); ♀ Beulah, N. M. (W. P. Cockerell).

Crabro (*Cuphopterus* Moraw.) **operus** n. sp.

♀. Length about 7 mm. Clypeus with the usual medial carina, the anterior margin with four distinct, rather sharp teeth; ocelli in a triangle, the distance between the lateral ones about equal to the distance from them to the nearest eye margin; first joint of flagellum a little longer than the second; usual frontal depression above antennæ; a line-like furrow from frontal depression to lower ocellus; a more indistinct one from lower ocellus to vertex; head finely and densely punctured, more sparsely on occiput and cheeks; face sub-opaque, cheeks shining; pronotum with a rather strong anterior ridge, dentate laterally; dorsulum with very fine longitudinal striæ on posterior part, and sub-transverse striæ on anterior part; among these striæ are punctures and at first sight the dorsulum looks finely punctured; a medial ridge for nearly the entire length of dorsulum; scutellum with large sparse punctures; mesopleuræ rather finely striate; enclosure of metathorax obliquely striate, a distinct longitudinal furrow down the middle; this furrow broadens somewhat on posterior face and forms a fovea; posterior face of metathorax with some transverse striæ, stronger below; sides of metathorax finely striated; lateral ridges distinct; ridge between upper and posterior face not as strong as lateral ridges, more or less indistinct; a transverse furrow on basal half of some of the abdominal segments above; abdomen indistinctly punctured above; second ventral segment with a few large, shallow punctures; pygidium narrowed apically as in the *sexmaculatus* group, rather acute at apex; four posterior tibiæ serrate beneath; all the femora robust; tarsi single; first recurrent nervure in apical third of cell. Color black; spot on mandibles, scape behind, tubercles, spot on all the tibiæ beneath, a small elongate spot on sides of abdominal segments 2-5 *yellow;* tarsi, more especially the anterior pair, and tegulæ reddish; clypeus and lower inner orbits with silvery pubescence; sides of pygidium with long gray hairs; rest of insect without hair. Wings subhyaline, nervures and stigma dark brown.

Habitat—Beulah, N. M. (W. P. Cockerell). Two females.

The striation of the dorsulum seems to run this species into Fox's group *singularis,* but it is certainly not any species in that group. Disregarding the striation of the pronotum, it runs to *paucimaculatus* Pack., from which it may be separated

by the pronotum being dentate laterally, having no yellow on the metanotum, etc. While in Ashmead's table it runs to *Cuphopterus* Moraw., it does not seem to be closely related to any of the species of that group.

Crabro opwana* n. sp.

♂. Length 7-9 mm. Clypeus rounded on the anterior margin, slightly emarginate in the middle, middle carina not very strong but still plainly seen; front between eyes from a little above the middle of eyes smooth, shining; near the eyes there are a few striæ; rest of head with large, distinct, well separated punctures; ocelli in a triangle; scape wider at apex than at base; flagellum stout, first and second joints equal, smooth, without a fringe of hairs; pronotum rather longer than usual, a distinct, slender, sharp tooth at anterior corner; (this tooth is stronger in some specimens than others); dorsulum, scutellum with large distinct punctures; mesopleuræ strongly strio-punctate; mesopectus rather finely punctured; episternum and epimeron of metathorax distinctly striated with strong striæ; metathorax without an enclosure, dorsulum and posterior face strongly punctured, the dorsulum more strongly; first joint of hind tarsi distinctly longer than the longest spur of hind tibiæ; anterior femora produced beneath for the entire length, near the base is a sharp tooth; (in some specimens there is another much smaller tooth near the apex); middle femora produced beneath so that when viewed from behind each is somewhat rectangular; posterior femora normal; posterior tibiæ serrated on the outer margin; middle tibiæ not serrated, without spur at apex; first recurrent nervure in apical sixth of cell; abdomen strongly constricted between the first and second segment, and less so between segment two and three, and sometimes three and four; basal segments with distinct, well separated punctures, apical segment very finely punctured; venter with some well separated punctures. Color black; scape except a spot behind, tubercles, sometimes two spots on pronotum, spots on first six abdominal segments above, (these spots meet on segments five and six, forming a band), apex of anterior and middle femora (the yellow on the anterior femora is wider beneath) legs below femora except a black spot on four posterior femora within, *yellow;* hind tarsi somewhat infuscated; antennæ beneath somewhat testaceous but not strongly so. Wings dusky hyaline, apical half a little the darker; nervures and stigma dark brown (the stigma in one specimen is pale brown.) Clypeus, lower half of inner orbits, lower part of cheeks, sides of thorax and pectus with silvery pubescence.

* Opwan is the Chippewa (Indiana) word for thigh. Used here on account of the spine on the fore femora.

Habitat—Eight ♂ ♂ Florissant, Colo., July 7, 1907, 8000 ft., fls. *Heracleum lanatum*, (S. A. Rohwer).

In Fox's table (Crabroninæ of Boreal North America) this species runs to between *hilaris* Sm. and *cognatus* Fox., but is neither of these and not any of the species of the *hilaris* group, being easily separated by having the antennæ entirely without hair and other characters. Easily separated from *C. snowii* Fox which falls in the same place by the naked antennæ. Following Dr. Ashmead's arrangement (Can. Ent.) this species would probably form a new genus near *Paranthyreus* Kohl being separated from it by the absence of a spur on the middle tibiæ.

Crabro (*Protothyreopus* Ashm.) **megacephalus** n. sp.

♀. Length about 13 mm.; width of head 3 mm.; width of thorax 2½ mm,; length of anterior wing 9 mm. Head wider than thorax, large; closely, evenly and rather finely punctured throughout; line from lower ocellus rather faint; ocelli in a low triangle, the distance between the two hind ocelli slightly less than the distance between them and the nearest eye margin; clypeus rounded anteriorly, middle carina not strong, without lateral teeth; distance between the eyes at the clypeus about the same as the width of the clypeus in the middle; first joint of flagellum about as long as 2 and 3, flagellum somewhat clavate, covered with microscopic pile; pronotum strongly ridged anteriorly, dentate laterally, the anterior face longitudinally striated; dorsulum and scutellum densely and finely punctured, almost matted; tegulæ with some very fine punctures; meso-pleuræ distinctly, transversely striate above, striato-punctate below, meso-pectus punctured; dorsulum of metathorax obliquely striate from middle; posterior face and side very finely transversely striated; middle furrow of metathorax not strong; slightly foveolate on posterior face; first recurrent received near apex of first cubital; femora robust, somewhat triangular (more especially the fore femora); anterior tarsi slightly flattened; middle and posterior tibiæ serrated on outer margin; abdomen above finely, densely punctured; ventral segments without large punctures, but with a number of small ones; pygidium broad, triangular, with large elongate punctures; sides of pygidium with a more or less distinct fringe of white hairs. Color black; mandibles except apex, scape entirely, two spots of pronotum, tubercles, spot below tegulae, two small lateral spots before the scutellum, postscutellum, apex of femora and legs below (middle and posterior femora have the yellow extending inward), two large spots on dorsal abdominal segments one and two, and a wide band on

segment 3, 4 and 5 *deep yellow;* tegulæ part yellow and part testaceous; wings hyaline, the apical margin slightly dusky; nervures, costa and stigma pale brown to testaceous; clypeus, lower inner orbits, lower part of cheeks, fore femora above thorax (more strongly so on pectus and posterior face of metathorax), sides of three apical abdominal segments with silvery pubescence.

Habitat—Florissant, Colorado, July 6, 1906 (S. A. Rohwer).

The following table will separate this species from all its allies. It is more closely related to *rufifemur* Pack., but quite distinct. The table is based on the females of the subgenus *Protothyrepus* (Fox's group rufifemur).

Head and thorax with long, dense hair; ventral segments of abdomen 2-5 spotted with yellow (Calif.) . . . . . **villosus** Fox.

Head and thorax without such hair; venter of abdomen immaculate. . 1.

1. Posterior face of metathorax with two yellow spots (Atlantic coast generally . . . . . **bigeminus** Patt.

Posterior face of metathorax immaculate, black. . . . . 2.

2. Pygidium strongly margined by a wall, slightly but distinctly depressed apically; head not larger than usual (Colorado, S. Dakota, Montana, Washington) . . . . . **dilectus** Cress.

Pygidium not thus margined and not depressed apically; head large . . . . . 3.

3. Mesopleuræ striato-punctate throughout; enclosure of metathorax striato-punctate, posterior face distinctly transversely striate; punctures of scutellum sparse; punctures of first abdominal segment large and distinctly separated; second ventral segment with large well-scattered punctures; no yellow beneath tegulæ; two elongate yellow spots on third abdominal segment; legs partly rufous; fore femora without or with very little white pubescence above (U. S. east of Rocky Mts., and north of a line from Nebraska to Maryland . . **rufifemur** Pack.

Mesopleuræ distinctly striate above; enclosure of metathorax finely obliquely striated; posterior face very finely transversely striate; punctures of scutellum dense; punctures of first abdominal segment finer and denser; second ventral segment without large punctures; a large yellow spot below tegulæ; third abdominal segment with a broad band; femora without rufous; fore femora above with white pubescence (Colo.).

megacephalus Roh.

Crabro (*Solenius* Lept. ?) **ferrugineipes** n. sp.

♂. Length 10 mm.; length of anterior wing 8 mm. Head not as wide as thorax, closely, finely punctured (punctures densest between the eyes; ocelli in a low triangle; each ocellus in a depression; distance between the two lateral ocelli distinctly less than the distance

between them and the nearest eye margin; no furrow from middle ocellus; clypeus without lateral teeth, rather strongly rounded in the middle; middle carina not strong; first four joints of flagellum emarginate beneath, the apex of the fourth joint slightly produced at the apex beneath, first joint a little longer than second; pronotum rather strongly ridged anteriorly, a stout, sharp tooth laterally; dorsulum and scutellum with large separated punctures; meso-pleura transversely striate above striato-punctate lower down; meso-pectus punctured; dorsulum of metathorax punctured; sides and posterior face of metathorax transversely striate (the striæ of posterior face larger); middle furrow distinct, strongly foveolate on posterior face; upper and posterior faces separated by a circular furrow; fore tarsi very slightly flattened; first two abdominal segments constricted at base; first two dorsal segments distinctly punctured, punctures large and well separated; the following segments are more finely and more densely punctured; venter smooth, shining; genitalia with a comb of long hair beneath. Color black; mandibles within, scape entirely, two spots on pronotum, tubercles, postscutellum, small elongate spots on sides of second abdominal segment, broad band on dorsal segments 3-6 *deep yellow;* tegulæ mostly ferruginous; legs below trochanters, ferruginous (posterior tibiæ and tarsi are somewhat yellowish); wings dusky hyaline, nervures pale brown, costa and stigma testaceous. Clypeus, lower, inner and posterior orbits with silvery pubescence; head, thorax first dorsal ventral abdominal segment with long black hair; last five dorsal segments with short black hair.

Habitat—Pecos, N. M., July 16, 1903 (W. P. Cockerell).

In Fox's table (Crabroninæ of North Am.) this species runs near *texanus* Cress., but the punctures on the head are not large and well separated, the legs are differently colored, 3-6 abdominal segments banded etc. It has much general resemblance to *spiniferus* Fox, but the punctures on the dorsulum are even throughout, the abdomen more closely punctured, size larger, the legs below the coxæ are ferruginous, etc. The fore tarsi are very slightly flattened and in some respect it is like *rufifemur* Pack., but is very different.

Crabro (subgen. ?) **nokomis** n. sp.

♀. Length 12 mm.; length of anterior wing 9 mm.; width of head 3 mm.; width of thorax 3 mm. Head large, as wide as thorax, closely, finely punctured; ocelli in a low triangle; distance between the two lateral ocelli less than the distance between them and the nearest eye margin; in front of each ocellus in a small depressed area;

no furrow from middle ocellus; clypeus produced in middle into a truncated process, the width of which is equal to the distance between the eyes at the clypeus; middle carina strong; mandibles bifid at apex, with three inner teeth, the first tooth small; first joint of flagellum equal to 2 and 3; pronotum not strongly ridged anteriorly, but feebly so, not dentate laterally, anterior face smooth; when seen from in front there is a U-shaped fovea at the top in the middle; dorsulum finely densely punctured posteriorly, finely striato-punctate posteriorly; scutellum punctured anteriorly, longitudinally striated posteriorly; meso-pleuræ strongly transversely striated; meso-pectus smooth with large scattered punctures; dorsulum of metathorax finely obliquely striated from center; sides and posterior face of metathorax *finely* transversely striated; middle furrow strong, distinctly foveolate on posterior face; femora stout, triangular in cross-section; anterior femora with a strong keel on inner posterior margin, outer margin of middle and posterior tibiæ with a number of stout spines; dorsulum of abdomen densely finely punctured, the punctures on the first segment larger and more separated; venter of abdomen microscopically punctured; apical margin of each segment with a row of large punctures; pygidium strongly margined, strongly depressed and narrowed apically; sides of pygidium with a fringe of testaceous hair. Color black; elongate spot on mandibles, scape entirely, two spots on pronotum, tubercles, apex of femora, tibiæ except a black spot within on the anterior four (tarsi dull testaceous), elongate spots on sides of first three abdominal segments above (those on the third largest and almost meeting, those on the first small and well separated), broad band fourth and fifth segments above, *yellow;* tegulæ rufous; wings dusky hyaline; nervures, costa and stigma pale brown. Middle of clypeus with golden pubescence; sides of clypeus, lower inner orbits, posterior orbits, lower part of thorax with silvery pubescence.

Habitat—Florissant, Colo., June 26, 1907 (S. A. Rohwer).

In Fox's table (Crabroninæ of N. Amer.) this species runs near *montanus* Cress., but it may be known from all of that group by the different sculpture, larger size, fringe at side of pygidium, etc. Disregarding the structure of the clypeus it runs to *trifasciatus,* but is at once known from this by the ocelli being in a lower triangle.

Crabro (*Thyreopus*) **brachycarpae** n. sp.

♂. Length 7 mm.; length of anterior wing 5 mm. Head about as wide as thorax, finely densely punctured, cheeks without tooth or keel; ocelli in about an equilateral triangle, the distance between the

two lateral ones slightly less than the distance between them and the nearest eye margin; a distinct line-like furrow above and below middle ocellus; facial basin smooth, shining; clypeus rounded anteriorly, slightly notched in middle, without teeth; no middle carina on clypeus; distance between the eyes at the clypeus about equal to width of clypeus in the middle; antennæ simple, flagellum (excluding pedicellum) a little more than twice as long as scape, first joint of flagellum a little longer than second; pronotum not ridged anteriorly, a small blunt tooth laterally, on anterior face finely punctured; dorsulum finely densely punctured; on the anterior portion there are some large punctures with many fine ones in between; meso-pleuræ very finely striato-punctate; no furrow between the epimeron mesopleuralis and mesosternum, but there is a small circular fovea in about middle; scutellum with irregular large punctures; dorsulum of metathorax with distinct longitudinal striæ, the striæ well separated; sides and posterior face irregularly transversely striate; middle furrow distinct, on posterior face triangularly foveolate; first recurrent nervure nearer the middle than apex of cell; anterior trochanters triangular, not quite half as long as their femora; tibial shields a little longer than broad, anterior and posterior angle rounded; medial tarsi very slightly flattened, the first joint equal to the following joints united; abdomen shining, apparently not sculptured. Color black, including mandibles; scape except a spot at base within, clypeus more or less, large spots on pronotum, tubercles, scutellum entirely, postscutellum, apex of anterior four femora, tibiæ except spot within on middle, a spot on inner and outer apical margins of posterior, tarsi (apical joints infuscated), band on all the dorsal abdominal segments (band on second and third slightly broken in middle), small spot on second and third ventral segments, *greenish-white;* tegulæ black; wings hyaline but not clearly so; nervures testaceous; thorax and head with long, rather sparse, white hair; clypeus and narrow, lower inner orbits with silvery pubescence; shield cream-colored, the apical two-thirds streaked with black.

Habitat—Florissant, Colo., June 23, 1907, on *Salix brachycarpa* (S. A. Rohwer).

Closely related to *C. vernalis* Pack., but easily known by the color of the shield, the presence of a circular fovea on mesopleuræ, the shorter first joint of flagellum, and other characters.

Crabro (*Xestocrabro* Ashm.) **heraclei** n. sp.

♂. Length about 8½ mm.; length of anterior wing 5 mm. Head about the same width as thorax, closely, finely punctured, occiput finely striato-punctate; ocelli in a rather low triangle; furrow from lower ocellus faint; distance between hind ocelli less than that to the

nearest eye margin; facial basin distinctly margined above, smooth, shining; first joint of flagellum a little longer than second, first and fourth emarginate basally, second and third slightly produced in middle beneath; clypeus rounded anteriorly, slightly produced in middle, without lateral teeth; middle carina well developed; pronotum produced anteriorly, notched in middle, a strong sharp spine laterally, a faint transverse carina near apical margin; dorsulum rather coarsely striato-punctate, striæ more distinct posteriorly, two distinct longitudinal carina; scutellum striato-punctate or striated; meso-pleura transversely striated above, punctured below, meso-pectus shining, finely punctured; suture between episternum and epimeron meso-pleuralis strong; upper surface of metathorax divided by a margined furrow, the walls of which separate the upper and posterior faces by turning at right angles with the furrow; upper surface with a few oblique striæ, also some punctures; furrow abruptly ending below middle of posterior face; posterior face with three more or less distinct transverse striæ, rest apparently finely punctured; sides of metathorax finely, closely, transversely striated; all femora without teeth; middle tibiæ without apical spur; middle and posterior tibiæ with a few teeth on outer margin; abdomen shining, very finely punctured, venter without punctures; apical segment sharp at apex, with a fringe of hairs. Color black; spot on apex of scape in front, two elongate spots on pronotum, two small spots before scutellum, postscutellum, rather large spot on dorsal segments 1-4, band on dorsal segments five and six, *greenish-yellow;* legs black, line on posterior side of anterior femora and a spot on apical anterior side, spot on apex of middle femora, anterior four tibiæ beneath, spot on posterior tibiæ beneath, anterior tarsi, *greenish-yellow;* tegulæ rufous; wings dusky hyaline; nervures and stigma dark brown; clypeus with silvery pubescence; meso-pleuræ with white hair.

Var. with the sculpture of dorsulum weaker, meso-pleuræ more striato-punctate, ridges of metathorax not so prominent, tubercles yellow.

Habitat—Florissant, Colo., July 7, 1907 (S. A. Rohwer), fls. *Heracleum lanatum.* Var. Florissant, Colo., June 26, 1907 (S. A. Rohwer), on foliage of *Salix brachycarpa.*

This species may be separated from all others of the subgenus *Xestocrabro* by the strongly spined pronotum. In the somewhat striated effect of the dorsulum it resembles *singularis* (=*maculatus*) but there is no spine on the anterior femora. Closest to *foxii* Kinc., but the structure of the metathorax is different and the scape is partly yellowish, etc.

Crabro (*Xestocrabro*) **drymocallidis** n. sp.

♂. Length 5½ mm.; length of anterior wing 4 mm. Head finely rather sparsely punctured; ocelli in about an equilateral triangle; distance between hind ocelli less than that between them and the nearest eye margin; a furrow from lower ocellus to facial basin; facial basin smooth, shining, not meeting eyes on sides, rather obtusely pointed above; first joint of flagellum longer than second, first three joints emarginate basally, produced at apex, apex of fourth joint slightly produced beneath; clypeus rounded anteriorly, without teeth; middle carina not strong; pronotum sharply truncate anteriorly, without ridge or teeth; slightly notched in middle; dorsulum more densely punctured than head, without longitudinal carina; scutellum striato-punctate; meso-pleuræ finely, transversely striated, some striæ stronger than others; suture between episternum and epimeron meso-pleuralis quite distinct; furrow of middle segment distinct; upper and posterior faces divided by a ridge; upper surface shining, with a few oblique striæ; sides and posterior face transversely striated; anterior femora produced at base beneath; middle tibiæ without apical spur; abdomen smooth, shining, impunctate, widest beyond middle. Color black; small spot on apical part of scape beneath, tubercles, small spots on sides of second, third and fourth dorsal abdominal segments *bright-yellow;* legs black, anterior femora beneath *rufous,* anterior tibiæ beneath, anterior tarsi, spot on apical part of middle femora beneath, spot on posterior tibiæ beneath *yellow* or rufous; wings dusky hyaline; nervures and stigma dark brown; clypeus, cheeks and lower part of thorax with silvery pubescence.

Habitat—Topaz, Butte, Teller Co., Colo., alt. about 9000 ft., June 23, 1907 (S. A. Rohwer), fls. *Drymocallis fissa.*

May be separated from its allies by anterior femora produced beneath, smaller size, darker color, etc.

Crabro (*Crossoceros*) **cockerelli** n. sp.

♀. Length about 4½ mm.; length of anterior wing 3½ mm. Head as wide as thorax, shining, impunctate or very finely punctured; ocelli in an equilateral triangle; the distance between the two hind ocelli about equal to the distance to the nearest eye margin; a distinct furrow from the anterior ocellus to occiput; furrow from anterior ocellus to near the base of antennæ not so strong as upper furrow, sides more sloping; facial basin not distinctly defined; antennæ slender, not at all clavate; first joint of flagellum a little longer than second; flagellum beneath with a row of very fine, rather short hairs; clypeus rounded on outer margin, without teeth or middle prominence; middle carina not distinct; pronotum with a low, rounded, indistinct ridge anteriorly, without teeth laterally, slightly notched in

middle, smooth, shining; dorsulum smooth, shining, with a few very small punctures, a more or less distinct longitudinal furrow in middle; meso-pleuræ smooth, shining, impunctate, suture rather strong; upper surface of metathorax with some short, longitudinal striæ at base; furrow not strong, convexities shining, very finely striated; upper and lower surface separated by a furrow; posterior face on metathorax with a triangular fovea at basal middle, bounded by ridges at the sides, finely transversely striated; meta-pleuræ finely transversely striated; legs normal, middle tibiæ without spur; first transverse cubital received before middle of radial cell; abdomen smooth, shining, impunctate; pygidium broad, obtusely rounded at apex. Color shining black; spot on scape in front, line on pronotum, tubercles, scutellum *dark yellow;* legs—anterior trochanters and femora except a black line *reddish-yellow;* anterior tibiæ and tarsi, except a line behind, middle femora except a broad line behind and a narrow one in front, middle tibiæ except a line behind, middle tarsi, base of posterior tibiæ and a line beneath *yellow;* clypeus and thorax beneath with white pubescence; wings hyaline, slightly dusky at apex, irridescent; nervures and stigma dark brown.

♂. Very much like ♀. Furrow on front stronger, metathorax furrow stronger, scape and tubercles black.

Habitat—Florissant, Colorado, July 17, 1906 (Ckll.) ♂ and ♀ "flying around *Ribes*;" 2 ♂ ♂ July 19, 1906 (Ckll.).

The ♀ runs near *lentus* Fox in Fox's table (Crabronidæ of N. Amer.) but differs as follows: clypeus without medial tooth; antennæ more slender; metathorax somewhat different; tubercles yellow; posterior tibiæ entirely yellow beneath, etc. May be known at once from *harrisii* Pack. by the dark venation. The ♂ runs to *impressifrons* Sm. but is not that species.

Crabro (*Crossoceros*) **eriogoni** n. sp.

♀. Length about 5 mm.; length of anterior wing 4 mm. Head as wide as thorax, densely finely punctured; broad, smooth, low furrow from lateral ocelli to upper orbits; ocelli in an equilateral triangle; distance between hind ocelli a little greater than that to the nearest eye margin; furrow from anterior ocellus to facial basin; facial basin smooth, shining; antennæ slender, very slightly subclavate, first and second joints of flagellum subequal; clypeus rounded anteriorly, without teeth; middle carina wanting or almost so; pronotum very slightly ridged anteriorly; dorsulum finely densely punctured; meso-pleuræ finely striato-punctate; suture rather weak; in basal middle is a large puncture; scutellum similar to dorsulum in sculpture; furrow of metathorax rather faint on upper surface, more distinct on

posterior face; convexities finely, longitudinally striated; middle furrow triangularly foveolate on posterior face above; posterior face and sides striato-punctate; striæ stronger; middle tibiæ with apical spur; femora rather more robust than usual; transverse cubitus received a little before middle of radial cell; abdomen shining, impunctate, pygidium triangular, rather sharp at apex, but not excavated, with a few large punctures. Color black; scape in front, mandibles except apex, tubercles, tips of anterior femora, anterior tibiæ, middle tibiæ except a black spot, base of posterior tibiæ, basal joint of middle and posterior tarsi *yellowish;* anterior tarsi ferruginous; clypeus, cheeks, thorax at sides and beneath with silvery pubescence, wings clear hyaline, iridescent; nervures and stigma dark brown.

Habitat—Jim Creek, Boulder Co., Colo., Sept. 7, 1907 (S. A. Rohwer), fls. *Eriogonum effusum,* Transition Zone.

Accompanied at flower by *Crabro errans* Fox, *Prosopsis* spp., *Odynerus* spp.

In Fox's table runs between *propinquus* Fox (Texas) and *minimus* Pack. (Eastern States) but there is no median prominence on the clypeus, and it differs in other characters.

Rhopalum modestum n. sp.

♂. Length 5½ mm.; anterior wing 4 mm. Head smooth, shining, impunctate; around each lateral ocelli is a depressed area; front slightly broken in middle by a line; facial basin rather narrow, shining; antennæ rather slender, pedicellum with tooth beneath, first flagellular joint emarginate, second produced beneath, remaining simple, pale at base; clypeus strongly produced medially, sides of this projection with small teeth, in middle there is a rounded tooth; pronotum rounded; dorsulum with very fine punctures; meso-pleuræ almost impunctate, suture almost wanting; suture of metathorax strong; metathorax shining; ridge on sides of posterior face; posterior four trochanters elongate; femora robust, especially the anterior pair; posterior tibiæ enlarged at apex; venation normal for genus; abdomen as usual in this genus. Color shining black; clypeus somewhat and antennæ piceous; scape beneath, tubercles, apical half of coxæ, trochanters, apex of four anterior femora, their tibiæ except a black spot within, anterior four tarsi, base of posterior tibiæ *yellow;* tegulæ, apex of posterior tibiæ, apex of abdomen *brownish-red;* clypeus and lower inner orbits with silvery pubescence; wings clear hyaline; iridescent; nervures dark brown.

Habitat—Boulder, Colo., May 30, 1906 (T. D. A. Cockerell).

Rhopalum Kby.—group *pedicellatus* Fox. This agrees exactly with this genus. The following table will separate the American species of this genus in the male sex.

Metathorax with an enclosure . . . . . **pedicellatum** Pack.
Metathorax without an enclosure . . . . . 1.
1. Abdomen banded with reddish, anterior four legs entirely yellow; basal joint of middle tarsi simple . . . . . **rufogaster** Pack.
Abdomen black; anterior four legs more or less black; basal joint of middle tarsi with a spine within . . . . . **modestum** Roh.

The following table will separate all the species mentioned above:

Females . . . . . 1.
Males . . . . . 16.
1. Pygidium broad, flat, not strongly excavated towards apex . . . . 2.
Pygidium narrow, strongly excavated . . . . . 10.
2. Small species; abdomen entirely black . . . . . 3.
Large or medium size species; abdomen marked with yellow . . . 5.
3. Ocelli in a low triangle . . . . . **errans** Fox.
Ocelli in an equilateral triangle . . . . . 4.
4. Shining; scutellum yellow; fore trochanters and femora reddish. **cockerelli** Roh.
Subopaque; scutellum black; fore trochanters and femora black. **eriogoni** Roh.
5. Ocelli in an equilateral triangle; head and dorsulum finely punctured; mesopleurae shining, with a few punctures . . **confertus** Fox.
Ocelli in a low triangle . . . . . 6.
6. Mesopleurae shining; with few punctures . . . . . 7.
Mesopleurae subopaque, striato-punctate or striated . . . . . 8.
7. Stigma and costa dark brown; ocelli (dry) deep black; metathorax more strongly sculptured . . . . . **conspicuus** Cress.
Stigma and costa ferruginous; ocelli (dry) yellowish; metathorax not so coarsely punctured . . . . . **vincus** Cress.
8. Pygidium strongly margined by a wall, slightly but distinctly depressed apically; head not larger than usual. . . **dilectus** Cress.
Pygidium not thus margined, not depressed apically; head large. . 9.
9. Enclosure of metathorax striato-punctate; legs partly rufous. **rufifemur** Pack.
Enclosure of metathorax obliquely striated; legs yellow and black. **megacephalus** Roh.
10. Ocelli in an equilateral triangle; shining black . . . **nigricornis** Prov.
Ocelli in a low triangle . . . . . 11.
11. Clypeus produced into a truncated process . . . . . 12.
Clypeus rounded anteriorly, not produced into a truncate process... 13.
12. Head densely, finely punctured; clypeus with some golden pubescence . . . . . **nokomis** Roh.
Head with large punctures; pubescence of clypeus silvery. **bellus** Cress.
13. Posterior face with strong lateral ridges; abdomen with small yellow spots; slender head, thorax and abdomen nude . **operus** Roh.
Posterior face of metathorax without strong lateral ridges . . . . 14.

14. Dorsulum very closely punctured; upper and posterior faces of metathorax indistinctly separated . . . . . **trifasciatus** Say.
Dorsulum not so closely punctured; upper and posterior faces of metathorax not separated . . . . . **6-maculatus** Say.
15. Abdomen petiolate, petiole clavate; coxae and trochanters yellow. **modestum** Roh.
Abdomen not petiolate . . . . . 16.
16. Anterior tibiae with a large shield . . . . . 17.
Anterior tibiae without such a shield . . . . . 18.
17. Antennae simple; markings greenish-white . . . **brachycarpae** Roh.
Antennae beyond second joint enlarged, joints somewhat flattened, dentate beneath; markings yellow . . . . . **latipes** Sm.
18. Ocelli in an equilateral triangle . . . . . 19.
Ocelli in a low triangle . . . . . 20.
19. Larger; entirely black . . . . . **ater** Cress.
Smaller; more or less marked with yellow . . . . . **cockerelli** Roh.
20. Anterior femora simple . . . . . 21.
Anterior femora produced at base beneath or spined . . . . . 25.
21. Small; abdomen entirely black . . . . . **errans** Fox.
Larger; abdomen marked with yellow . . . . . 22.
22. Abdomen distinctly punctured; larger . . . . . 23.
Abdomen impunctate; smaller . . . . . 24.
23. Legs below coxæ ferruginous; punctures of dorsulum larger and more separated; wings darker . . . . . **ferrugineipes** Roh.
Legs black and yellow; punctures of dorsulum smaller and closer; wings dusky hyaline . . . . . **dilectus** Cress.
24. Pronotum rounded anteriorly, without a spine . . . **trifasciatus** Say.
Pronotum keeled anteriorly and with a lateral spine . . **heraclei** Roh.
25. Larger; punctures large and strong; fore femora with strong spine; legs largely yellow . . . . . **opwana** Roh.
Smaller; punctures very fine; fore femora produced at base beneath; legs almost entirely black . . . . . **drymocallidis** Roh.

The types of all the new species described above are in the author's collection.

BUTTERFLY FAKERS.—The butterfly was a beautiful deep blue, as lustrous as satin; but, looking at it closely, the collector shook his head.

"Another fake," he said. "See here."

And with his finger he brushed off the glistening blue dust from the insect's wings, and lo! it was but a common brown field butterfly after all.

"As the collecting of butterflies grows more popular," he explained, "more butterfly fakers turn up. These men, with various aniline dye powders, color up a ten-cent insect into a good resemblance to a $10 one. Their work is hard to detect, for the reason that, when the dye rubs off and discolors your fingers, you suspect nothing, since the genuine dust belonging to every butterfly's wings would do the same thing."—*Newspaper.*

Notes on Erebus odoratus L.

By C. H. Fernald, Amherst, Mass.

In the February number of Ent. News, page 83, Dr. Was, gave his experience in capturing *Erebus odora* L. in Oostburg, Wis.

This insect was first named *Phalaena* (*Bombyx*) *odorata* Linn. in the Systema Naturæ, ed. X, Vol. 1, page 505, 1758, and the same name was given in Clerck's Icones with a very fine colored figure of the female. In the twelfth edition of his Systema Naturæ, Vol. 1, Part 11, page 811, 1767, Linnaeus changed the name to *Phalaena* (*Attacus*) *Odora*. Why it was changed from *odorata* to *odora* is not clear to me. Formerly, entomologists made use of the twelfth edition of the Systema Naturæ and only in recent times has the tenth edition been adopted as a starting point in Zoology. This accounts for the general use of the later name, *odora*, instead of the older one, *odorata*. Aurivillius has given a comparatively full synonomy of this insect in earlier works, in his Recensio Critica Lepidopterorum Musei Ludovicæ Ulricæ quæ descripsit Carolus A Linné, pages 151, and 152, 1882, which work seems to have been generally overlooked in this country. In accordance with the International Rules of Zoological Nomenclature, Articles 26 and 27, this insect should be known by the name of *Erebus odoratus* (L.).

Two specimens of this insect were taken on the same evening last summer in the city of Boston. One flew into an office in the Tremont building and the other flew into an open window of the Governor's office in the State House but a short distance away. In 1872 a specimen was found resting on one of the buildings at the University of Maine, at Orono, Maine, nine miles north of Bangor, which is in latitude 44° 54′ 2″ N., the farthest north that I have heard of the capture of this species.

The question whether this and other southern insects as the cotton worm, fly over seemingly enormous distances and are finally captured in these northern latitudes; whether they are accidentally carried north in the pupal stage; or whether they

breed occasionally in the northern localities where they are found is an interesting one, and has been discussed pro and con for many years.

Erebus odoratus (L) has been taken 150 miles at sea, off the coast of Brazil, as stated by Walker in his Catalogue of Lepidoptera Heterocera, Part XIV, Noctuidæ, page 1290, 1858, and in this case there is little doubt that the insect in question was blown off the coast by the wind and alighted on a ship at the above named distance from the shore.

Julian P. Thomas, in an article entitled "Ballooning as a Sport," published in Appleton's Magazine for November, 1906, states that "as high as 2,000 feet there are still frequently seen butterflies, mosquitos, and other insects." We are further informed that in the upper currents of air, even in strong winds, while the balloon is carried along at a rate of 50 or 75 miles an hour, or even more, everything seems as quiet to the occupants of the car as would be the case in a calm. Under such circumstances, may not moths, even as large as *Erebus odoratus,* be swept in the strong upper currents of the air from the Bahama Islands where they breed, as far north as Orono, a distance of about 1400 miles? Such a flight in a 50 mile breeze would require but 28 hours.

The Green Aphis of the Chrysanthemum—Aphis rufomaculata n. sp.

By H. F. Wilson, Urbana, Illinois.

The specific name of this louse was suggested by the bright red spots which seem always to be present upon the abdomens of the viviparous females.

Apterous viviparous.—♀.

General color green, head somewhat dusky on vertex, eyes light red, prominent, thorax green, abdomen green with about 2 to 4 little red dots—eyes of the embryos—showing on both the dorsal and ventral sides, and a slight yellow discoloration at bases of cornicles. The antennae are light green at the base shading to blackish at the distal ends, femora pale green, tibiae very pale green, dusky at the distal

ends only, tarsi black; style green to blackish, short and ensiform; the honey tubes are long and cylindrical, green at the base and shading into dusky at the ends, or all dusky, their peculiar form as described for alate female below; beak pale green, dusky at tip, barely reaching 3d coxae.

Measurements about as follows: body, 1.40 mm.; style, .11mm.; honey tubes, .27mm.; antenna, .80mm.; joints III, .17; IV, .13; V, .11; VI, .11; VII, .18mm. respectively.

Alate viviparous.—♀.

General color green, head dusky to black, eyes bright red and very prominent, prothorax green with dusky to black transverse band; mesothorax blackish upon central portion, lateral margins green; abdomen green; wings hyaline with distinct, rather conspicuous dark veins, the base green. The abdomen and the head are sometimes mottled with light orange; mesosternum black; the beak is a very light green, dusky at the end. Along each side of the green abdomen above there often are 4 or 5 small dusky spots which do not show in all specimens; style ensiform and .11 mm. long. Antennae about 1.06 mm. long, green at base and blackish beyond the middle of joint 3; 3d joint with about 12 sensoria, 4th with about 8, 5th with one large sensorium near the distal end and 2 or 3 along the middle portion; 6th, at the joining of the 7th., with six small and one large sensoria; joints about as follows: III, .27; IV, .17; V, .15; VI, .13; VII, .22 mm. The femora are dusky at outer end or entirely light green, tibiae dusky to black at distal ends, tarsi black, cornicles dusky greenish yellow throughout, cylindrical.

Length of body 1.30 mm.; wing, 2.13 mm.; stigma .60 mm.; narrow and parallel-sided; cauda .11 mm. dusky brown in color.

The very broad head and very prominent compound eyes are striking peculiarities in this species. The cornicles which would be classed as cylindrical are somewhat constricted immediately back of the slight flange, then comes a slight enlargment from which the cornicle very gradually diminishes in diameter to the base.

During my study of this insect as a student in entomology at the Colorado Agricultural College during the winter and spring of 1906 and 7, I did not find it upon any plants but the chrysanthemums. It seems to be strictly a greenhouse species at Fort Collins, as neither Prof, Gillette nor any of his assistants have found it upon out of door plants.

New Pyralidae.

By Frank Haimbach, Philadelphia, Pa.

Symphysa ochralis sp. nov.

Expanse of wings 15 mm. Entire upper surface of wings bright ochre-yellow, the secondaries somewhat lighter apically. Markings as in *Symphysa eripalis*. On the under side, only the outer line is visible, which is shaded inwardly with a dark brown line, from which line the whole area to apex is light brown, darkest on primaries. Distinct discal dots on all wings on under side only.

Described from six specimens from Denver, Colo., vii, 17, '05 (Oslar).

Blepharomastix occidentalis sp. nov.

Expanse of wings 23 mm. Markings as in *Blepharomastix ranalis*, but heavier. Ground color is considerably darker than in *ranalis*, approximating brown, with the entire upper surface covered with evenly distributed dark brown atoms. The species is closely related to *ranalis*, but can be readily separated by its uniformly larger size, and darker color, also by the upper wings of male, which are narrower and more pointed.

Described from eight specimens collected by Mr. H. A. Kaeber, at Miller's Canyon, Huachuca Mountains, Ariz., July, 1907.

Blepharomastix nymphulalis sp. nov.

Expanse of wings 20 mm. Upper and under surfaces of both primaries and secondaries lustrous whitish ochre, with well defined brown markings, similar to *Nymphula ekthlipsis*, which it mimics in this respect. The markings are the same beneath as above. The species is closest to *Blepharomastix stenialis*, but the secondaries are more produced basally, and the markings are more distinct and ornate.

Described from nine specimens collected at Cincinnati, Ohio, by Miss Annette F. Braun, on June 12, 17, and July 2 to 10th.

Pyrausta insequalis plagalis var. nov.

Differs from the Eastern form, by having the markings of the front wings supplemented with bright crimson red; the ground color is also lighter, and the markings are not so heavy. Hind wings, ground color bright orange, on which the lines are much finer.

Described from one specimen collected by Mr. H. A. Kaeber, at Miller's Canyon, Huachuca Mts., Ariz., July, '07. This may prove to be a distinct species, but having but the one specimen, it is probably better for the present to give it only a varietal name.

Crambus oslarellus sp. nov.

Expanse of wings 25-30 mm. Head and palpi cinereous. Primaries and thorax lustrous bronze, with a silvery white stripe from the base to near subterminal line; a tooth in the middle on the lower side, and a small white spot above the outer end of white stripes. Secondaries smoky white. The species closely resembles *Crambus praefectellus,* and has no doubt been confounded with it. The principal points of difference are its much larger size, the smoky hind wings, and the absence of reddish line inside of white subterminal line, which is present in *praefectellus;* also the subterminal line forms nearly a right angle, which is not the case in *praefectellus.*

Described from ten specimens, collected at Silverton, Colo., and Clear Creek, Colo., vii, 3, '07, by Mr. E. J. Oslar, in whose honor this species is named.

Three related American species of Aeshna (Odonata).

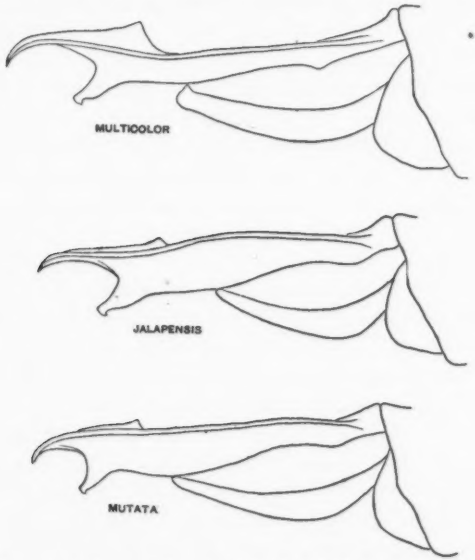
By E. B. Williamson.

The three species are: *multicolor* Hagen, *mutata* Hagen and *jalapensis* n. sp. They are characterized as follows:

Rs forking proximal to the level of the stigma, with 3 or 4 rows of cells between the fork at the level of the distal end of stigma; the proximal side of the triangle in hind wing more than half as long as the posterior side; membranule fuscous with the base more or less white or gray; stigma of adult males dark brown or black above; dark yellowish brown beneath; immature males and females have the stigma golden yellow, paler beneath; a ventral spinulose tubercle on abdominal segment 1; a black T-shaped spot on the frons, which spot widens posteriorly to enclose the vesicle in black, and margins the eyes in front with a line of black; thorax brown with a dorsal and two lateral stripes on each side; legs black, the first femora of both sexes beneath with a pale streak for half their length and all femora of females reddish brown above for the greater part of their length; abdomen constricted at segment 3; males with a minute median dorsal tooth on abdominal segment 10, and appendages seen in profile distinctly forked at apex with an angulate dorsal carina; abdominal appendages of the female of usual form, the apex rounded obtuse, varying from 5 to 7 mm. in length in different species.

Differentials:—*Mutata* and *jalapensis* are separated at once from *multicolor*: males,—the inferior basal tubercle of the superior appendages in *multicolor* at one-fourth to one-fifth the length of the appendage, in *jalapensis* and *mutata* at one-

sixth to one-seventh the length of the appendage; and the narrower appendage and higher keel of *multicolor* as compared with *jalapensis* and *mutata*, as seen in profile; females,—each abdominal appendage of *multicolor* is nearly symmetrical, the outer and inner edges with about the same curvature; the length 5 mm.; in *jalapensis* and *mutata* the outer edge of each appendage is nearly straight, the inner edge broadly curved; the length 6 mm. in *jalapensis* and 7 mm. in *mutata*. By appendages of males *jalapensis* and *mutata* are separated by the



longer dorsal carina and apical fork of the superiors, and the shorter (one-half the length of the superiors) inferior in *jalapensis;* in *mutata* the apical fork is reduced in size and the inferior appendage is two-thirds the length of the superiors.

The ventral spinulose tubercle on abdominal segment 1 is most pronounced in *jalapensis* and *multicolor*, the spinulose area in *mutata* being raised into only a very low tubercle. On segment 2 on margins about the accessory genitalia *mutata* is more spinulose than the other two.

The T-shaped spot on frons is best developed in *jalapensis*, and of smallest area in *multicolor*. In *multicolor* the stem of the T in front is about .66 mm. wide and the sides of the stem are straight or slightly concave, diverging posteriorly and isolating the blue vesicle and the lateral ocelli from the blue area of the frons by a band of black about twice as wide as the ocelli. The ocelli are separated from the blue vesicle by a line of black narrower than the ocelli. In *mutata* the stem of the T in front is wider than in *multicolor* but scarcely 1 mm. wide, but the sides, instead of being concave, are distinctly convex, and the vesicle is less blue, the vesicle and the lateral ocelli more widely separated from the blue area of the frons, and the lateral ocelli separated from the vesicle by a line of black fully as wide as the ocelli. In *jalapensis* the stem of the T in front is over 1 mm. wide, the sides straight but more divergent than in the other two species, the lateral ocelli and vesicle isolated from the blue area of the frons by a band of black about three times as wide as the diameter of the ocelli; the extent of blue on the vesicle as in *mutata*.

In coloration of abdomen males of *mutata* and *multicolor* are almost identical, although the blue spots are slightly reduced in *mutata* especially on segment 10; *jalapensis* has the spots greatly reduced. A similar reduction is true also of the more obscurely colored females. In the matter of coloration of *jalapensis* and *mutata* we have an exactly parallel case in the two species with very similar appendages which have been associated under the name *constricta*. In this case, as in the case of *mutata* and *jalapensis*, the species with the dark-colored abdomen is the slenderer, less robust of thorax. The habits of the two species associated under *constricta* are well known to me and are entirely distinct; it is probable that *mutata* and *jalapensis* show a parallel difference in habits.

Some venational characters of the three species are tabulated below. These may be summarized briefly, calling attention to *mutata* and *multicolor* especially, since in these venational differences are most constant.

1. *Mutata* compared with *multicolor* has narrower wings with distinctly less curved supplements and a more distal ter-

mination of Cu_1 at wing margin; (*jalapensis* is fairly intermediate in these characters).

2. In *mutata* the anal loop is distinctly wider, with a median cell and shorter outer side than in *multicolor*; (*jalapensis* has a wide anal loop of a form similar to *mutata*, but the outer side is variable in length).

3. *Mutata* has a larger number of cells in the wings as shown by:

a. The presence generally of two rows of cells throughout between M_3 and M_4 in hind wing distal to point where two rows of cells first appear between these veins; (*jalapensis* intermediate).

b. The larger number of cubito-anal cross veins in both front and hind wings; (*jalapensis* intermediate).

c. The larger number of cells in the triangle of hind wing; (*jalapensis* resembles *multicolor*).

d. The larger number of cross veins in the supertriangle of both front and hind wings; (*jalapensis* intermediate).

e. The larger number of antenodals and postnodals in both front and hind wings; (*jalapensis* resembles *mutata*).

f. The more proximal origin of M_{1a}; (*jalapensis* resembles *multicolor*).

4. In *mutata* the more distal position of the arculus in terms of its relation to antenodal crossveins; (*jalapensis* intermediate, resembling *mutata*).

TABULATION OF VENATIONAL CHARACTERS.

The figures in the columns headed respectively "*multicolor*," "*jalapensis*" and "*mutata*" are in all cases those of percentages.

CHARACTERS		*multicolor* 10 ♂		*jalapensis* 5 ♂	1 ♀	*mutata* 10 ♂	2 ♀
		male	female	male	female	male	female
Length of stigma in front wing	3 mm.	30		100	100		
	3.5 "	70	50			50	
	4 "		50			50	100
M_{1a} in front wing arising	under stigma			10		15	
	at distal end of stigma			20	100	55	50
	beyond stigma	100	100	70		30	50

CHARACTERS		*multicolor* 10 ♂ male	*multicolor* 2 ♀ female	*jalapensis* 5 ♂ male	*jalapensis* 1 ♀ female	*mutata* 10 ♂ male	*mutata* 2 ♀ female
Wings narrower, supplements less curved (*a*)						100	100
Wings wider, supplements more curved (*b*)		100	100				
Wings intermediate in width, curving of supplements intermediate (*c*)				100	100		
Cu_1 in hind wing meeting wing margin with reference to level of nodus (*d*)	4 marginal cells beyond					10	
	3 cells beyond		50			40	100
	2–3 cells beyond					20	
	2 cells beyond	10		20	100	30	
	1–2 cells beyond		50				
	1 cell beyond	40		40			
	on same level	50		40			
Anal loop wide, A_2 arising basal to the last cubito-anal (*e*) cross-vein before the sub-triangle				100	100	100	100
Anal loop narrower, A_2 arising opposite or distal to last cubito-anal cross-vein		100	100				
Anal loop with a median cell (*i.e.* more than 2 cells wide near its middle)		30		100	100	100	100
Anal loop without a median cell		70	100				
Outer side of anal loop (formed by Cu_2 and A_1 before their separation) in hind wing	About as long as inner side of triangle (*f*)			20	100	100	100
	Longer than inner side of triangle (*g*)	100	100	80			
From the point where 2 rows of cells appear between M_3 and M_4 in hind wing to wing margin	2 rows of cells between throughout	15		40	100	75	75
	For at least part of this distance only 1 row of cells	85	100	60		25	25
Arculus in front wing	Opposite second antenodal	10	25				
	Between second and third, nearer second	85	75	10			
	Between second and third, nearer third	5		90	100	25	
	Opposite third					60	100
	Between third and fourth					15	
Arculus in hind wing	Between first and second antenodals	90	25	10		10	
	Opposite second	10	75	40		10	100
	Betweeen second and third			50	100	80	

CHARACTERS		*multicolor* 10 ♂ male	*multicolor* 2 ♀ female	*jalapensis* 5 ♂ male	*jalapensis* 1 ♀ female	*mutata* 10 ♂ male	*mutata* 2 ♀ female
Apex of triangle of hind wing with reference to the cross-veins between M_{1-3} and M_4	Between the third and fourth	25	25	20			
	Opposite fourth	45	50	10	50	20	
	Between the fourth and fifth	30	25	60	50	35	50
	Opposite fifth			10		10	50
	Between the fifth and sixth					30	
	Opposite sixth					5	
Cubito-anal cross-veins in front wing (*h*)	5	55	50	20		10	50 (*i*)
	6	45	50	80	100	40	50 (*j*)
	7					50	
Cubito-anal cross-veins in hind wing (*h*)	3	5 (*k*)					
	4	20	25				
	5	70	75	100	50	45	50
	6	5			50	55	50
Triangle, front wing	With two transverse cross-veins, 3-celled					10 (*l*)	
	With two transverse cross-veins, proximal cell divided, 4-celled	35	75	20	50	90	100
	With three transverse cross-veins, proximal cell divided, 5-celled	55	25	70	50		
	With three transverse cross-veins, two proximal cells divided, 6-celled	10 (*l*)		10			
Triangle, hind wing	With one transverse cross-vein, proximal cell divided, 3-celled	5					
	With two transverse cross-veins, proximal cell divided, 4-celled	85	100	60	100	10	50
	With three transverse cross-veins, proximal cell divided, 5 celled	10		40		90	50
Supertriangular cross-veins in front wing	2	60	50	10		25	25
	3	40	50	90	100	70	75
	4					5	
Supertriangular cross-veins in hind wing	1	25	25				
	2	75	75	100	100	40	75
	3					60	25

CHARACTERS		*multicolor* 10 ♂ male	*multicolor* 2 ♀ female	*jalapensis* 5 ♂ male	*jalapensis* 1 ♀ female	*mutata* 10 ♂ male	*mutata* 2 ♀ female
Antenodals in left front wing	14	10	50				
	15	30					
	16	30	50				
	17			60	100	10	50
	18	30		20		40	50
	19					40	
	20			20			
	21					10	
Postnodals in left front wing	7		50				
	8		50				
	9	40				10	100
	10	60		40		20	
	11			40	100	50	
	12			20		20	
Ante- and postnodals in left front wing	21		50				
	24	30	50				
	25	20					
	26	20					50
	27	10		20		20	50
	28	20		40	100	10	
	29			20		10	
	30					50	
	31			20			
	33					10	
Antenodals in left hind wing	9	10	100				
	10	40		40			
	11	40		40	100	20	
	12	10		20		30	50
	13					40	50
	14					10	
Postnodals in left hind wings	9		50				
	10	40	50			10	
	11	20		40	100	10	50
	12	30		20		20	50
	13	10				60	
	14			40			
Ante- and postnodals in left hind wing	18		50				
	19	10	50				
	20	30					
	21	10		40			
	22	10			100	20	
	23	20		20		10	50
	24	20					
	25			20		30	50
	26			20		30	
	27					10	

NOTES ON THE PRECEDING TABULATION.

a. In all specimens 3 rows of cells between Rs and the radial supplement and M_4 and the median supplement, excepting in 2 ♂ hind wings, where there are 4 rows between M_4 and the median supplement.

b. In 3 ♂ there are 3 rows of cells throughout between Rs and the radial supplement and M_4 and the median supplement; in 5 ♂ there are 4 rows of cells between throughout; in 1 ♂ there are 3 rows between Rs and the radial supplement in both front wings and in one hind wing, 4 rows elsewhere; in 1 ♂ there are 4 rows between M_4 and the median supplement in both hind wings, 3 rows elsewhere; in 1 ♀ there are 4 rows between M_4 and the median supplement in one hind wing, 3 rows elsewhere; in 1 ♀ there are 3 rows between Rs and the radial supplement in one front wing, between M_4 and the median supplement in both front wings, and 4 rows elsewhere.

c. In 2 ♂ there are 4 rows of cells throughout between Rs and the radial supplement and M_4 and the median supplement; in 1 ♂ there are 3 rows of cells between throughout; in 2 ♂ there are 3 rows of cells throughout excepting that in both hind wings of each specimen there are 4 rows of cells between M_4 and the median supplement; in the ♀ there are 4 rows of cells between throughout, excepting between M_4 and the median supplement in one front wing and Rs and the radial supplement in one hind wing, where there are 3 rows. (It should be stated that curving of supplements does not vary in a species with variation in number of rows of cells between veins and supplements, though it is true that among species those with straightened supplements have a reduced number of included cells.)

d. This character is of slight if any value because of the difficulty of accurate determination due to varying degrees in which the wing veins of dried specimens do not lie in the same plane.

e. Excepting in 4 wings ♂, 2 wings ♀ *mutata* and 4 wings ♂, 2 wings ♀ *jalapensis* where A_2 arises distal to last cubito-anal crossvein, but the anal loop is of usual width.

f. In every case but 1 wing of a ♂ *mutata* there are 2 cells on distal side of this outer side of anal loop; in this one wing there is only 1 cell.

g. In 18 wings ♂, 2 wings ♀ *multicolor* there are 2 cells on distal side of outer side of anal loop; 2 wings ♂, 2 wings ♀ *multicolor* and 1 wing ♂ *jalapensis* with 3 rows of cells on distal side.

h. The crossveins forming the subtriangle and dividing the subtriangle are counted.

i. In these 2 wings ♂, 2 wings ♀ *mutata* the subtriangle is not crossed; in one other wing of *mutata* ♀ the subtriangle is free; in all other cases the subtriangle is once crossed.

j. One wing ♀ with free subtriangle.

k. The subtriangle free in this wing; crossed in all other wings examined.

l. One individual, both wings.

(To be continued.)

Incidental Studies of new species of Oscinis.

By E. S. Tucker,
Special Agent, Bureau of Entomology, U. S. Dept. of Agric.

In my incidental studies of flies which were obtained by personal collecting during past and more recent years, four forms have been found belonging in the genus *Oscinis*, which fail to agree with any known species, and, in consequence, they are named and described herewith as new.

Oscinis nigra n. sp.

Colorado,—Denver; August, 1906. Type: one specimen deposited in the U. S. National Museum.

Wholly black, except fulvous tinge of halteres, and dull reddish eyes. Body and legs shining. Triangular space of front extending from the vertex to a point against the antennal insertions, lower angular edges of front dull opaque. Dorsum of thorax minutely punctured, bearing scattered black bristles, sides fringed; scutellum having two apical bristles of great length.

First and second sections of wings equal in length, third section about two-thirds the length of either one of the preceding, and fourth section one-half the length. Third and fourth longitudinal veins scarcely divergent. Length, 1.5 mm.

This specimen differs from all previously described forms of *Oscinis* on account of total absence of yellow or fulvous color, other than on the halteres.

Oscinis flavescens n. sp.

Colorado,—Manitou, 6629 ft.; August, 1894. Type: one specimen deposited in the U. S. National Museum.

Prevailing color yellow, with black markings as follows: A small spot on vertex enveloping the ocelli; three broad longitudinal stripes on mesonotum, the medial, except towards the distal end, is twice the width of a lateral one, beginning on the prothorax in advance of them and extending the entire length of mesonotum, while the lateral stripes taper to an end before reaching the posterior margin; metathorax polished black beneath the scutellum; dorsal base of abdomen and a median spot arising from anterior edge of second segment black, basal margin with a pronounced and rounded middle expansion on each succeeding segment also black; two subfuscous spots on pleura posteriorly beneath base of wing, and a strong dash of black on posterior coxal plate.

Eyes black; vertex and front punctured, somewhat shining on triangular area; third antennal joint disciform, arista black; dorsum of thorax clothed with fine grayish pubescence which glistens on the

black stripes, a fringe of black bristles extends along each side; scutellum regularly rounded behind, nearly as long as the width.

First and second costal sections of the wings about equal in length; the third and fourth together equal to one of the preceding; third and fourth longitudinal veins parallel. Length, 1.75 mm.

According to Dr. C. F. Adams' table of *Oscinis,* this specimen runs to *nuda* Adams, but it appears as a form too extreme to be regarded even as a variety on account of the following differences: no sharp definition of vertical triangle; vittæ of thorax black instead of brown, and three in number instead of four; no additional line above base of wing unless extremely obscure; black spot lacking above middle coxæ, but two faint or obscure maculations on pleura; scutellum lacking apical pair of bristles, wholly bare, (may possibly be denuded, however); fore margins instead of hind margins of abdominal segments black; tips of tarsi not black; third section of costa more than one-half as long as second section.

Oscinis frontalis n. sp.

Texas.—Plano, Collin county; one female specimen collected in May at dusk in oat field, and one male in November, 1907. Types deposited in the U. S. National Museum.

Generally yellow; front dull, thorax with sericeous pubescence, abdomen somewhat shining. Vertical triangle impressed, not quite reaching to the antennæ, a black dot enclosing the ocelli, and a second dot beneath the ocellar spot in the frontal triangle of the male; hair of front black and stubby, suggestive of minute bristles; arista black. Eyes black with slight pale pubescence.

Dorsal vittæ four in number, brownish black on the female, black on the male, the middle pair but slightly parted and shorter than the lateral ones, all failing to reach the posterior margin of the mesonotum; an additional short narrow stripe above the base of the wing. Lateral suture of pleura strongly lined with black, and a short black dash runs above each posterior coxa. Scutellum evenly rounded, bearing a few black bristles, the apical pair stout. Similar black bristles fringe each side of the mesonotum, and a pair arises near the posterior margin of the dorsum, each bristle standing at the distal end of a lateral stripe.

Metanotum shining black; abdominal segments infuscated at base, the female being more suffused with a dark cast especially overspreading the middle; anterior edges of second segment with a distinct small black dot; venter immaculate; protruded tip of male genitalia and of ovipositor of female black; claws black.

Wings clear hyaline, second costal section twice the length of third section, third and fourth longitudinal veins parallel. Length, 1.5 mm.

Although running to *O. ovalis* Adams, these specimens differ particularly by reason of the double length of the second compared with the third costal sections of the wings, and by the rather unusual appearance of an almost bristly front.

Oscinis dissidens n. sp.

Texas,—Plano, Collin county; June, 1907, one specimen taken in an experiment cage in oat field. Type deposited in the U. S. National Museum.

Mostly shining black; face below the frontal triangle, together with the oral region and mouthparts, excepting the palpi, venter of abdomen largely and dorsal base obscurely, knees of anterior and middle legs slightly, tibiæ of middle legs obscurely, all trochanters and the tarsi except at tip, and halteres, yellowish. Frontal triangle extending across the vertex, polished, reaching two-thirds of the distance to the antennæ, adjoining outer edges of front dull, front projecting over the antennal insertions. Antennæ dull opaque, third joint inwardly sericeous, arista pale and faintly pubescent. Mesonotum with faint pale pubescence, two fine sulci running forward from posterior margin, scutellum with a pair of small terminal bristles.

Wings clear, first and second costal sections equal in length, third and fourth longitudinal veins parallel. Length scarcely more than 1 mm.

Runs to, and agrees in many respects with *O. obscura* according to Mr. Coquillett's description, but the following distinguishing features are noted: greater part of the front yellow, tibiæ of fore legs black instead of yellow, and the second longitudinal vein joins the costa at more than half the distance instead of midway between the apices of the first and third longitudinal veins.

Notes on the Psychodidae.

By Leonard Haseman, University of Missouri.

Since the completion of my monograph of the North American Psychodidæ, which appeared in the Transactions of the American Entomological Society, Vol. XXXIII, I have been carefully watching for any new species and life histories which may turn up in this region.

The extreme minuteness and inconspicuousness of the adults, as well as the immature stages of these flies, makes their discovery in nature possible only by very close and persistent ob-

servations. While I have secured a number of my species on shaded windows and vine-clad walls of buildings, I have had far better results collecting the adults at night when they are readily attracted to lights. I have secured all my life histories by preparing vegetable cultures, in which they breed in great numbers. The past year two new life histories have been found, one of which proves to be that of a new species. A number of specimens collected between March 20 and June 20 have been identified as *Ps. schizura* Kin. Their wing length varies from 1.8 mm. to 2.8 mm., and they all have the black tufts at the tip of the veins and the alternate black and white markings which give the wings a mottled appearance. A few specimens collected between April 18 and May 24 have been identified as *Ps. cinera* Bks. This species has also been found fairly common in the caves of Indiana by Mr. A. M. Banta,* so that it probably appears over the entire range from the Atlantic to the Pacific.

Early in the spring of 1907 I collected a quantity of dry weeds and grass, and also some green grass and curly-dock leaves, which were put into two large square glass jars, covered with water and placed in the insectary to thoroughly ferment. In a short time mosquitoes appropriated the jars for their use. The adults and larvæ of the mosquitoes were collected and destroyed, and glass covers placed over the jars for a time. Later the covers were removed and early in June adult Psychodids were found in one of the jars. The cover was replaced on this jar and a large brood of adults appeared on the 13th of June. This jar was fairly teeming with them, while the other, which stood by its side, contained none at all. The first brood of larvæ and pupæ escaped my observation, but on the 15th of July a second brood of larvæ appeared, when the jar was removed to my laboratory and daily observations made on the habits of the larvæ, pupæ and adults. After the first adults were found in the jar, it was kept covered except when specimens were being removed. In this way five broods were reared during the summer. The adults of the first brood appearing June 13-20, the second July 17-20, the third August 8-12, the

* Carnegie Institute of Washington, publication No. 67, p. 84.

fourth August 20-27, and the fifth September 10-15. The broods gradually decreased in numbers of individuals until there were very few to appear in the last brood. The food supply began to get scarce after the second brood, and decaying potatoes were added, for which the larvæ showed great fondness.

The second jar, containing the decaying vegetable culture, was left standing uncovered in the insectary all summer. The mosquitoes did not return to it and no signs of Psychodids appeared in it. The water nearly all evaporated, so that by the first of December only a small quantity of water remained in the bottom to keep the grass and weeds moist.

While rearranging the insect breeding cages on December 9, I was surprised on lifting up the jar containing the culture to see a half dozen or so adult Psychodids fly out of it. The jar was immediately covered and removed to my laboratory. On the following day a few more adults emerged, but by the most careful examination no larvæ or pupæ could be found. A number of the adults were collected and mounted, while the rest were left in the jar for breeding. The second brood of larvæ and pupæ appeared during Christmas vacation when I was away and on my return the 5th of January, a great many adults were present in the jar. Some of the adults were again collected and others left for breeding. On the 6th and 7th of January the first signs of larvæ were noted. They had just hatched and were extremely small, and unlike the larvæ of the other species I have observed, were very sluggish. The first pupæ from this brood of larvæ were found on the 15th of January and adults began to emerge on the 16th. Only three broods of this Psychodid were reared; the adults appearing Dec. — to Dec. 9; Dec. — to Jan. 6; Jan. 16 to 25. Stragglers from the last brood continued to appear until the middle of February and a few specimens again appeared the last of March.

Returning to the first species, which was bred between June 15 and Sept. 15, I find, on comparing it with *Ps. floridica**

*Trans. Amer. Ent. Soc., Vol. xxxiii, pp. 316 and 324.

that a close relation exists between the two forms. My material of *Ps. floridica* has deteriorated considerably, especially the larvæ and adults, so that comparisons in some particular details are made with considerable difficulty.

There is a very marked difference in the size of the Missouri and Florida specimens, the larvæ of the latter being from one-fourth to one-third larger. The difference in size also appears in the pupæ and adults. The Florida larvæ have eight or nine dorsal plates on the posterior annuli of the abdominal segments, while the Missouri larvæ have but six. The Florida larvæ have no ventral thoracic plates, while the Missouri ones have two small widely separated plates on the posterior annulus of each segment. Each of these plates bears two long bristling hairs. In the living Missouri larvæ the internal organs show through the body wall as a broad creamy-white band in the region of the fourth and fifth abdominal segments, which did not appear in the Florida larvæ. These slight but uniformly constant differences convince me that this Missouri Psychodid is not the same as the Florida one, though certainly very closely related. The adults have been compared with *Ps. nocturnala* and their similarity in every respect is so great that I feel sure they are the same species. The dates of their appearance also correspond.

I find that my figures of *Ps. floridica* are slightly at fault on the segmentation of the posterior end of the abdomen. In some cases I find that the break between the last two annuli is so marked that I mistook it for a segmental rather than an annular division.

LARVA.

The larva is quite slender, cylindrical, measuring 11 mm. in length and .8 mm. in breadth. Each of the three thoracic segments is rather distinctly divided into two annuli. The first abdominal segment also has two annuli, while each of the other six abdominal segments has three. Each annulus of the two posterior abdominal segments has, on its dorsal surface, a small chitinous shield; the third shield of each segment being

the largest. Each of the abdominal and thoracic annuli are well armed with short, closely set spike-like hairs, which are more or less arranged in girdles, due to the annular divisions. Besides these short hairs there are two or four longer curved hairs on the dorsal surface of the posterior annulus of each segment, likewise one or two along the sides of the same annuli, and two pairs of similar hairs on their ventral surface. The paired ventral hairs on the thoracic segments are mounted upon small, widely separated, circular plates, similar to the dorsal plates on the posterior annuli except much smaller.

In living specimens the internal organs in the region of the fourth and fifth abdominal segment show creamy-white through the body wall. This did not appear in the Florida larvæ and is also obsolete in alcoholic specimens. No signs of anal tracheal gills are present. The thoracic air nipples are present on the dorso-lateral portion of the second prothoracic annulus. As in the case of the Florida specimens, these were not seen to be used by the larvæ for breathing.

The larvæ have the greedy habit of engulfing everything that they can get hold of. The alimentary canal is continually distended with food. The internal organs appear very distinctly through the body-wall, especially in case of specimens preserved in alcohol. The protrusions surrounding the anal opening are much more pronounced than in the Florida specimens. A test was made to determine the length of time they could live under water without coming to the top to breathe and the limit was found to be about twenty-four hours, as in the case of the Florida larvæ.

PUPA.

The pupæ are found hidden in the debris at the surface of the water, where they are continually kept moist and where they can protrude their thoracic breathing tubes out above the surface. The pupæ are somewhat larger than those from Florida and the abdominal spines are slightly less developed. There is a very marked difference in the size of the male and female pupæ. The latter are both longer and more heavily built. In-

cluding the thoracic breathing tubes, which are quite long and slender, the female pupæ are 4 mm. in length and .85 mm. in breadth.

The spines along the sides of the pupæ are inconspicuous, usually ending in a fine bristle-like hair. On the ventral surface the first abdominal segment behind the tips of the wing sheaths has but a single row of spines. Along the median line are three or four small spines, bordered on each side by one

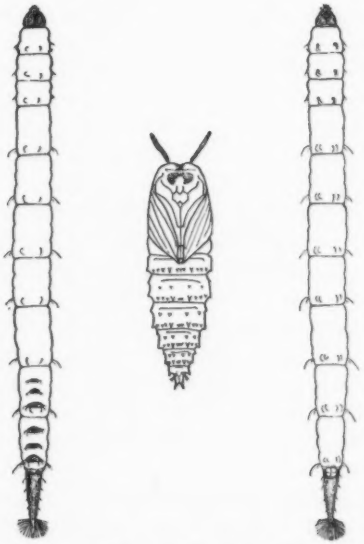


FIG. 1.—Dorsal and ventral view of larva and ventral view of pupa, *Ps. nocturnala* (X 20).

large spine and these in turn by three or four smaller ones, which extend out to the lateral edge of the body. The next four abdominal segments each have two rows of spines. The anterior row on each segment consists of four medium-sized spines, well separated and placed at equal intervals. In the middle of the second row on each segment are three small, closely-set spines, which are bordered on each side by one large

spine and these in turn by three or four spines, which decrease in size laterally. The posterior abdominal segment, viewed from the ventral side, has a basal portion, from the lateral sides of which projects a single strong spine, and from the ventral surface of which project two strong spikes, each of which terminates in two sharp spines. Posteriorly the segment is much constricted and terminates in two pointed spines with a narrow emargination between. Looking at the segment from the side, it can be seen that the dorsal half projects beyond the ventral portion and terminates in two very strong dorsally curved spines.

On the dorsal surface the segments have but a single row of spines. Along the median line of the back the first segment bearing spines has two small closely applied ones, the next two segments each have three and the next two segments each two. Lateral to these closely joined spines on each segment there is one strong spine, followed by three or four smaller ones. On the dorsal surface of the anterior abdominal and the thoracic segments there is usually a single papillæ bearing a fine bristle-like hair.

The dorsal spines curve slightly forward, while those on the ventral surface project backward. These help the pupæ in working their way up through the decaying vegetable material and in maintaining their position when they once get to the surface where their thoracic breathing tubes can be protruded out into the air.

The breathing tubes are very long and slender, with a short, much wrinkled stalk. The trachea can be traced to the very tip of the tube. There are two rows of small, circular foramina on the dorsal surface of each breathing tube. These foramina also surround the tip of the tube and extend some ways down the ventral surface in two rows.

In some cases the segments of the antennæ can be distinguished through the semi-transparent sheath. The ocelli can be seen through the sheath and are arranged in parallel rows extending almost at right angles to the longitudinal direction of the body. Some of the venation of the wings and the seg-

mentation of the tarsi can be distinguished through their sheaths.

Careful observations on the habits of the adults were made. They were often seen to settle upon the surface of the decaying material in the jar as if feeding, but I was unable to decide definitely concerning this; they may have been depositing eggs, as they were usually the large females.

The act of copulation was observed in a number of instances, and a few notes on these observations may be of interest to other entomologists. The males precede the females by a day or two and are very active by the time the females begin to emerge. Mating takes place soon after the females emerge and while they are yet quite sluggish. I have watched the males courting the females by taking a position immediately in front of them, where they remain perfectly motionless for several minutes, except for the continued waving of the antennæ, which are occasionally allowed to touch the antennæ of the female. When the males attempt copulation, they protrude the posterior end of the abdomen forward, much as the small Hymenopterous parasites do when they deposit eggs in plant lice, except that the abdomen is directed forward along the side of the body rather than directly underneath it. After the strong fang shaped male genitalia have firmly grasped the female, the insects turn end to end and have been seen to remain in coition for from one to two minutes. While in coition the wings stand roof-like, the male's being enclosed by the female's, much as in the case of butterflies.

Returning to the second Psychodid which was reared between December 9th and January 25th. This species differs very much from the other Psychodids I have observed. The larvæ are much shorter than the other forms and are broader than deep. The annulation is very distinct. The pupæ are short and plump, slightly broader than deep. The adult has been carefully compared with my other species, and as it does not conform to the descriptions of any of Bank's and Kincaid's species, I have decided that it is a new species.

LARVA.

The larvæ are extremely sluggish and have the habit of rolling themselves up in the decaying material and feigning death when disturbed. They are not nearly so greedy as the other forms, though they feed almost continuously. Occasionally they leave the culture and climb up along the sides of the vessel by carrying along with them a film of water. Specimens have often escaped from my watch-glasses and crawled about on the table until quite dry, but on replacing them in the glasses they would revive.

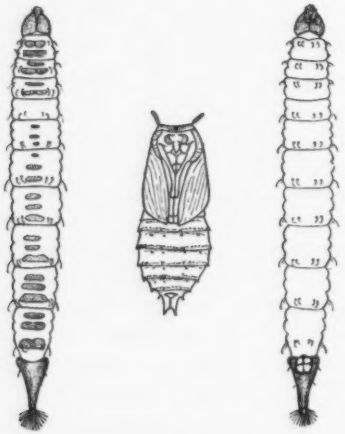


FIG. 2.—Dorsal and ventral view of larvae and ventral view of pupa, *Ps. domestica*, n. sp. (X. 20).

The larvæ attain a length of from 6 to 7 mm. and a breadth of .8 mm., and are slightly flattened. The thoracic segments and the first abdominal have each two distinct annuli, while the next six abdominal segments have each three. Each annulus, with the exception of those of the first abdominal segment, bears a distinct plate on its dorsal surface. There is some variation in the dorsal plates on the first three abdominal segments, and they are usually much reduced, though, as a rule, each annulus of the second and third segment bears a small

plate, and often the anterior annulus of the first segment also bears a plate.

The plates at the posterior and anterior ends of the body are much the larger. The first and usually the second prothoracic and first mesothoracic plates are so cleft from behind along the median line as to form two plates placed side by side. Besides these dorsal plates the body is well armed with very short bristling hairs and a few long ones. The posterior annulus of each abdominal segment bears two pairs of long bristling hairs on its dorsal and ventral surfaces and one or more similar hairs on its lateral margin. The anterior annulus of the thoracic segments bears similar hairs. These hairs are mounted upon low papillæ and are usually curved rather than straight. One or both pairs on the dorsal surface of the posterior segments may be mounted upon the dorsal plates.

The larvæ possess the prothoracic air nipples, as in the other forms. So far as I have been able to determine, these are never used for respiration, unless perhaps when the larvæ leave the water and crawl up the sides of the jar or along on the straws and weeds which extend above the water. At this time they have only a thin film of water around them and the four small projections bearing the cilia which protect the posterior breathing pores are usually retracted so that these breathing pores are closed and at such times air may be taken through the thoracic air nipples.

While feeding and while in the water respiration is carried on entirely through the posterior spiracles. It is interesting to watch this operation. After the larva has been at the bottom of the jar feeding for a while, a small bubble of gas will begin to form at the tip of the breathing tube. This is continued until the bubble has reached a considerable size, when the larva stops feeding, lets go all hold, and rises to the surface much as an æronaut. On reaching the surface the bubble bursts, the cilia around the spiracles spread out and hold the larva in place until a new supply is drawn into the tracheal system, when the cilia are retracted and the weight of the body of the larva carries it to the bottom of the jar again, where it continues to feed. The fresh air in the tracheal system is

under considerable pressure, so that the supply is not able to float the larva, but as soon as the pressure is released and the gas collects in a bubble at the tip of the tube, its buoyancy is sufficient to carry the larva to the surface. This operation is repeated every five minutes or so, depending upon the activity of the larva.

A test was made to determine the length of time the larvæ could remain submerged. For this purpose a small quantity of kerosene was poured over the water in a small dish and many of the larvæ were found to be still active after being deprived of air for a day.

PUPA.

The pupæ are oval in shape and somewhat flattened. They attain a length of 3.5 mm. and a breadth of .8 mm. The thoracic breathing tubes are much shorter than in the other forms, measuring about .25 mm. in length. The abdominal segments are well armed with numerous short, simple and compound spines. On the ventral surface the five segments posterior to the tip of the wing sheaths each has two rows of these spines. The first row on each segment is near its anterior edge and consists of four compound spines, well separated. The second row is near the posterior edge of the segment and consists of from six to nine small compound spines along the median line, bordered laterally by a single enlarged spine, and this followed laterally by a number of smaller ones. The compound spines consist of two or three small sharp spines borne on a low circular papilla. The posterior segment bears on its ventral surface a single strong compound spine, along the lateral edge of its slightly expanded base, while the tip is terminated by two slightly diverging strong simple spines with a broad emargination between.

The arrangement of the spines on the dorsal surface is about the same as on the ventral surface. Each segment has two rows, but the spines of the second row are smaller and more closely set than on the ventral surface. Six of the abdominal segments bear these rows of spines on their dorsal surface,

while only five of them have spines on the ventral surface. The ventral surface of the first segment bearing dorsal spines is hidden by the tip of the wing sheaths. The dorsal portion of the last segment is curved dorsally and ends in two very strong spines. On the dorsal surface of the last segment near the base there are two laterally projecting spines as on the ventral surface.

The breathing tubes are club-shaped, with a short, much wrinkled stalk, and bear two longitudinal rows of foramina along their dorsal surface. The segmentation of the antennæ shows distinctly through their semi-transparent sheath.

Psychoda domestica n. sp.

Body dark brown to black, clothed with long black hair, which to the unaided eye gives the insect a distinct blackish appearance. Thorax lighter than abdomen, and in some specimens the hair has a brownish cast. Legs black with black hairs and scales, the latter on the hind tarsi brownish. Wings long, rather acutely rounded at the tip of second simple nervure; evenly and well clothed with long black hair; posterior fringe black, about one-half the breadth of wing; anterior fringe much narrower; dense tuft of long black hair on base of costa. Anterior furcation one-sixth length of wing nearer tip than posterior; slightly beyond middle of wing. Female wing, length 2.25 mm. to 3.25 mm.; breadth, .75 mm. to 1.00 mm. Male, length, 1.8 mm. to 1.85 mm.; breadth, .65 mm. to .7 mm. Length of antennæ about one and one-half breadth of wing; 16-jointed; 1, slightly longer than broad; 2, spherical; 3-13, with basal enlargements and terminal pedicles, which are slightly swollen in the middle; 14-16, much reduced and closely applied to 13 and to each other; 3-16, with dense whorls of smoky-black hairs; 1-2, with shorter hairs and scales. Male genitalia strongly developed; superior pair about as strong as inferior; two-jointed; basal quite strong, slightly longer than broad; second twice as long as first, slightly expanded at base, weaker distally where it terminates in a very acute claw; inferior genitalia one-jointed, greatly expanded at base, but tapers rapidly to tip, which bears a single long, strong papilla about one-half the length of the segment. Ovipositor and ventral plate yellowish brown; ventral plate broader than long, with broad emargination behind reaching half way to base; ovipositor as long as breadth of plate, much curved; plate and base of ovipositor armed with short hair.

Habitat:—Columbia, Missouri; bred in laboratory from December 9th to March 20th.

Some Observations at Southern Pines, N. Carolina.

By Abram Herbert Manee, A. M.

Strategus antaeus.

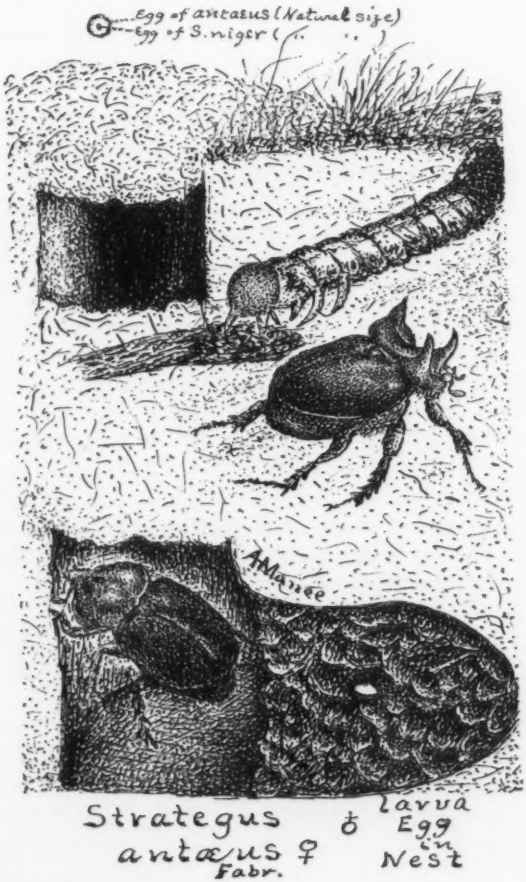
In these sand hills, where the long-leaf pines denude the ground of all but their own litter; in these black-jack barrens, where the many spaces bare among the tufts of wiry grass gleam white in vivid harmony with black and yellow; here, where neither stones nor gravel hinder plunge of trowel, there is free field for study, and in the World of the Little the toilers in the soil incite to special interest.

My first *antaeus*, picked up in winter, were charred by ground fires. In summer, '05, came my first polished males. On the night of July 11, '06, I took my first females by electric light. That same month we investigated an inch hole by a cart path and dug out a working male. July 26 I took my first pair from between two exposed roots of a large oak. They were pulverizing the surface soil, preparatory to shaft digging. After several such takings of pairs and singles, I came to know the peculiar mound of earth always pulverized to a depth of one to three inches. August 3d I dug beneath an old mound and found an egg. August 9th and 14th several more eggs, and I note as follows:

Beneath the mound of loosened soil an inch shaft extends vertically for six or eight inches. At bottom of shaft a one-and-a-quarter inch chamber reaches horizontally from one to five inches, and in this chamber, packed with finely broken bits of decadent oak leaves, a solitary egg is deposited. Sometimes two or rarely three such chambers diverge from the same shaft, but I believe with never more than one egg in each. A favorite haunt for nesting is by a pile of dead oak leaves wind blown in some hollow, from which I conclude that the young larva feeds on leaf debris and later on decadent oak roots.

The newly laid egg is oblong and white, in length fully three-thirty-seconds of an inch. In three or four days the egg swells to globular and is fully one-eighth inch in diameter.

From seven or eight eggs taken August 14th and placed in a jelly tumbler I found on August 25th five larvæ from five-eighths to seven-eighths inches. They had eaten eggshells



and some dead oak-leaf debris. The last larva emerged August 30th—length, five-sixteenths inch; color, white, with head fuscuous. In September one larva had become *cannibal* and *de-*

voured all the other larvae. (This probably accounts for the eggs being deposited solitarily.) October 12th the cannibal larva, less than two months old, had grown from its abnormal feeding to a length of two inches; color: head blackish, legs and spiracles yellow-brown, body whitish, with blue-black showing through, under side and last three segments blue-black.

From August, 1907, three larvæ from eggs were fed separately on dead oak leaves and roots, and at four months were only one inch long, so that the two months old two-inch cannibal specimen was doubtless of abnormal size. It would be interesting to rear a larva-fed *antaeus* grub into pupa or imago and note whether it would become a giant specimen or simply mature more rapidly.

Strategus splendens, Beauv. This rare species occurs here with a season at least two months earlier than *antaeus.* In June and July I find only dead specimens, and a fresh living beetle was dug from my garden January 1st, within a few feet of which I found on the same date an imago which had evidently died just after moulting, as the elytra were abortive.

Geotrupes balyi. This species buries not only animal droppings, but decadent fruits. I noted it working under spoiled cocoanut and also under refuse watermelon. Dr. L. O. Howard wrote me that this was a new observation.

Sandalus niger. I have discovered what was, I believe, hitherto unproved, that the *reddish male of Sandalus* is a fixed variety of *niger.* Dr. Howard writes me that Dr. Horn, in his synopsis of the genus, suspected this relationship. He wrote also that my dates are interesting, as in the vicinity of Washington, D. C., where *S. niger* is rare, the mating season is not later than August. I note as follows:

"In November, 1904, took two or three living females on dead black-jack oak. In November, 1905, found a few females, and Mr. R. S. Woglum, acting State Entomologist, took one red male, the first found here. In November, 1906, we took twenty females, three black males and two red males. I then suspected that the red males were *niger,* as we found *no red females* to correspond. In November, 1907, we took *forty*

females, every one a black-brown *niger; four* black males and *fourteen* red males. Two of the black males were in sexual contact, and in several instances a red male, sometimes two, were attached to a *niger* female. On warm sunny days the red males were flying. It was exciting to draw one down by a wave of the net when it would descend on an incline and strike the ground like a pebble. If we simply allowed it to reach an oak most surely a female would be found quite near.

The season here for *niger* is October 26th to December 1. On this last date I took a female in the act of ovipositing. The egg is pure white, cylindrical, convex at each end, more than twice as long as wide and so minute (one-forty-fifth of an inch in length) that five lengths would not equal the diameter of the egg of *S. antaeus.** The eggs are irregularly clustered in a crack of bark or wood or on under side of loose bark of a *dead* branch or trunk of black-jack oak and are attached by *silken* or *webby* threads.

The female imago is a full inch in length, entirely nude of hair, with the nine outer segments of antennæ in *short* laminæ increasing to the thickened tip. The male is from 11-16 to 13-16 inclusive, in length; pubescent beneath and above especially on face; thorax and base of elytra, and with the nine antennal laminæ of equal length, 5-32 inch.

Mr. E. T. Cresson, the distinguished Hymenopterist and treasurer of the American Entomological Society, has been in charge of the publications of the Society since 1861, a record of 47 years' unselfish service in the interest of entomology.

H. J. Quayle, assistant professor of Entomology in the University of California, will be located at the Southern California Pathological Laboratory, Whittier, Cal., after July first.

On September 3rd, 1907, I took a perfectly fresh specimen of *Callidryas agarithe* ♂, at Beach Haven, New Jersey; it was found in company with large numbers of *eubule*, of which I took twenty-one males and nine females. Is this not a new record for New Jersey? The specimen was in such perfect condition that it seems impossible that it could have flown up from the South.—W. G. Freedley, Jr.

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*I estimate that 200 eggs of *S. niger* would equal in bulk one egg of *S. antaeus*, but *antaeus imago* is very heavy and *niger* imago very light. The egg of *Dynastes tityrus* is also small, one-half the diameter of that of *antaeus*.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., JUNE, 1908.

We have touched on this subject before, but would again like to remind our readers that we are not egotistical. To those who so kindly write articles for the NEWS we wish to say that the editors of this journal are the most learned people in the world, and in addition to that are mind readers. Also, time hangs heavy on our hands as we have nothing to do. Don't take the trouble to number the pages of your Ms. as we can do it better. Write botanical names and names of places any old way. We know all the botanical names and have become familiar with all localities, having lived in each one.

When you give measurements of insects, especially new species, you need not write the figures plainly, as knowing everything we can readily decipher them. The names of all new and proposed species are known to us in advance, and knowing them yourself it is not necessary to be particular about how you write them. When writing us you need not be particular about your name and address, as we can read anything. If errors occur just blame us and the printer. The printer, by the way, is a wonder. He reads Russian, Chinese and Sanscrit with greater facility than he does English. The collecting season has begun, so we may be able to forget the editorial department for a time.

P. S.—Don't forget to mix up exchange notices and other matter for the NEWS with personal matter to the Editors.

Entomological Literature.

STUDIES IN NORTH AMERICAN MEMBRACIDÆ. By Edward P. Van Duzee.

This paper was published in the Bulletin of the Buffalo Society of Natural Sciences Vol. ix, pp. 29-129., issued April 18th, 1908. The author gives the results of a systematic study of all the membracids in his own collection and of material obtained from correspondents. Synoptical tables of the subfamilies, genera and species are given, and also outline figures of many species. At the end of the paper is a list which includes all the species known to exist north of the Southern boundary of the United States. The paper is a very valuable contribution to the subject.

PROCEEDINGS OF THE HAWAIIAN ENTOMOLOGICAL SOCIETY. I part 5.

This gives an account of the meetings with notes and exhibitions, and also contains the address of the President and a paper by G. W. Kirkaldy, entitled "A List of the Described Hemiptera (excluding Aleyrodidæ and Coccidæ) of the Hawaiian Islands."

A REVISION OF THE TENEBRIONID SUBFAMILY CONIONTINÆ. By Thomas L. Casey. Proceeedings of the Washington Academy of Sciences; Vol. x, pp. 51-166.

The Tenebrionid genera, *Eusattus, Coniontis, Coelus, Branchus* and *Praocis* and others, are considered, and new genera and many new species are described in this paper.

DIRECTORY OF JESUIT NATURALISTS.

Frederick A. Hillig, S. J., has compiled and published a pamphlet of 34 pages under this title in No. 4 of Vol. II. of St. John's College Quarterly, St. John's University, Toledo, Ohio, April, 1908. The names (arranged alphabetically), addresses, specialties in natural history, desiderata and oblata of 108 members of the Society of Jesus throughout the world are given, followed by indices arranged according to specialties and to countries of residence.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

THE EGGS OF INSECTS OF THE LAKES OF CHALCO AND TEXCOCO, IN THE VICINITY OF MEXICO CITY AND THE FORMATION OF OOLITHS.—M. L. Cayeux has a brief article on this subject in a publication not likely to be consulted by many entomologists—the recently issued Compte Rendu of the 10th Session of the International Geological Congress, held in

Mexico City in September, 1906, and published in that place under date of 1907, received in Philadelphia in March, 1908. M. Cayeux discusses (in French, pp. 1223-1227), first, the geological portion of a communication of Virlet d'Aoust "on the eggs of insects serving as food for man and giving rise to the formation of ooliths in the lacustrine limestones of Mexico" (Compte Rendus, Acad. Sci. Paris, vol. 45, p. 865, 1857). Then, on the basis of material furnished him by the Mexican Geological Survey he concludes: It is undoubted that the egg of an insect, entire or broken, is a centre of concentration for the limestone of the lacustrine sediment and that it determines the formation of innumerable small, iregular nuclei, but in truth it does not form an oolith properly so called in the Mexican lakes. The globules which result from the molecular concentration of carbonate of lime around the eggs have the morphological characters of ooliths. They possess, when they are complete, a central voluminous nucleus, in which are to be found all the elements of the lacustrine sediment, and a non-differentiated thin and irregular cortical zone. In white light, one never discerns concentric or radiate structure; in polarized light, the extremities of a well-marked black cross are often observed. As they are to-day, these globules constitute a new and highly interesting category of *false ooliths*, that is corpuscles which to the naked eye are not to be distinguished from true ooliths and which arise—according to the sedimentation—either by partial crystallization of a limestone sediment or by concentration of carbonate of lime around foreign bodies. The false ooliths in process of formation in the neighborhood of Mexico City are essentially different from ooliths with concentric structure so widespread in the primary and secondary rocks. However, the lacustrine and brackish water deposits of the tertiary may contain some elements of the same origin. The microscopic study of this terrain is too little advanced to affirm that this category of pseudo-ooliths is not represented there.

[Neither M. Cayeux nor M. Virlet d'Aoust mention the species of insect concerned. Perhaps the eggs are those of *Corixa* referred to in many text books of entomology.]

ANNOUNCEMENT.—The Lake Laboratory, maintained by the Ohio State University, announces the usual program for the coming summer, including courses in General Zoology and Botany, Entomology, Ornithology, Experimental Zoology, Comparative Anatomy, Ecology, Embryology, Invertebrate Morphology and Ichthyology also opportunities for research work and accommodations for investigators as in previous years. The staff will include, besides the Director, Professor E. L. Rice, of Ohio Wesleyan University; Professor Lynds Jones, of Oberlin; Professor Charles Brookover, of Buchtel College;

Professor M. E. Stickney, of Denison University, and W. B. Herms, at present Fellow in Zoology at Harvard University.

The opportunities offered are especially good in Entomology, and special attention is given to the aquatic life of the locality. Opportunities for research work in this line are very favorable. Independent investigators are given the use of tables free of charge, but are expected to furnish their own microscopes and other apparatus. The locality is an excellent one for summer work, the laboratory being situated on the point separating Sandusky Bay and Lake Erie, with its frontage on a fine beach.

For circulars or detailed information, letters may be addressed to the Director, Professor Herbert Osborn, Ohio State University, Columbus, Ohio.

To THOSE interested in exotic Rhopalocera the following note may be of interest: On the 19th of December, 1903, I took a fine male of *Ornithoptera pegasus* at Garoet, Java, which locality is nearly one thousand miles west of the western limit for species of the "priamus" group. The specimen was taken in a narrow native trail through the jungle at the foot of the Papandajan, an active volcano less than ten miles from the town of Garoet.—WILLIAM G. FREEDLEY, JR.

A MOSQUITO LULLABY.

Hush, little skeeterbug, hush a-by,
Mother will rock him, don't you cry!
I know you are hungry, my little sweet,
With nothing to drink, and so little to eat,
The natives are tough, and their blood is thin,
But the city folks soon will be rolling in—
Hush, little buzzer, go by.

Hush, little skeeterbug, hush a-by,
Think of the summer time, just you try!
Chubby old ladies and thin old boys,
Plump little children and, joy of joys,
Fat little babies, all fresh and sweet,
And juicy and lovely for you to eat.
Hush, little buzzer, go by.

Hush, little skeeterbug, hush a-by,
Soon you'll be ready to buzz and fly.
Father will sharpen your dear little bill,
And mother will teach you to bite, she will!
Maybe they think we are slow and dumb,
But we are not afraid of petroleum!
Hush, little buzzer, go by.—From *Chicago American.*

A HAPPY FAMILY OF BUGOLOGISTS.

To the Chief of the Bureau of Entomology, Doctor L. O. Howard.
With the Consent of Dr. Dyar.

In 1878 when first we started the long strife
Against the tribe of bugs, against their life,
We kept the war up hot and bitter,
To exterminate the nasty critter,
Who claimed the world to be his own;
In every land in every zone.
At last, we found, we were too few,
To cope with this audacious crew,
But at this stage! we did expand,
Our progeny now claims the land!
We raised a family large and bold,
Which, with firm grip, and a fair hold,
Fights all our battles without fear,
Against all bugs though far or near,
We may, therefore, be justly proud!
Of such a bright and brilliant crowd.
Since then, some bright lights passed away,
While others went off, far astray,
To spread our doctrine here and there
Without a favor or a fear!
We have become a mighty tribe,
In woods, in barrens, and waste land!
Wherever we may be on hand.
We kill the lice, we kill the bugs,
But are quite careful of the frogs,
Who always prove a friend in need
When bugs are plentiful for feed.
We trap the skeeter in his lair,
When the sky is clear and fair,
Because we know he has a chink
Which we detect just in a wink.
It's well, therefore, our offspring grow
To give fraternity a show.
Times are so hard, these days of zest!
It's well to take a little rest,
To gather lots of pent up steam,
To bottle up another scheme
But! since it is now rather late,
And while the balance points at fate,
It's time for all to go to rest
To stand the strains of coming test.
We therefore humbly do resign!
To efforts of the laws sublime.

Theodore Pergande.

Washington, D. C.

EXCHANGES.

Not Exceeding Three Lines Free to Subscribers.

☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

I have for exchange fine *Parnassius apollo, delius; Arg. dia, adippe, amathusia, pales; Van. io, urticæ;* many Erebiæ; *Sat. hermione, circe, alliona; Lycæna bellargus*, etc. Wanted cocoons of *cynthia, promethia*, etc., pupæ of *ajax, turnus, troilus, cresphontes, myops, geminatus* and others.—J. W. H. Harrison, 181 Abingdon Rd., Middlesbro' England.

Noctuidæ wanted in exchange. Am especially in need of a good series of *Mamestra nimbosa* at present. Have only Noctuidae to offer.—F. H. Wolley Dod, Millarville, Alta, Canada.

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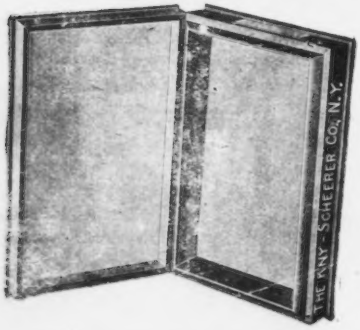

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